FLIGHT

MAGAZINE

JANUARY 1959

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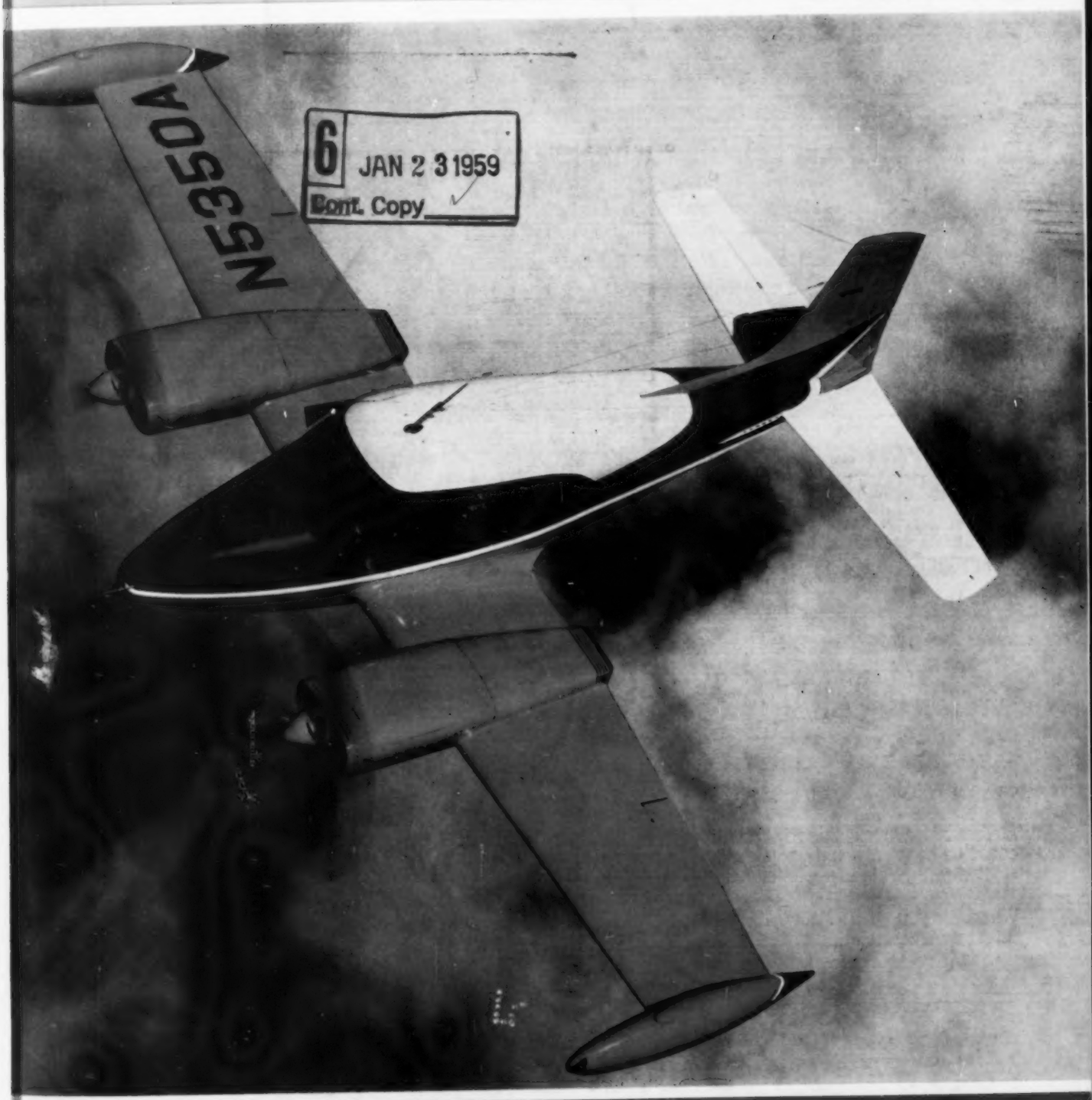

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CESSNA 310C

(See High Performance in Comfort, page 20)

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(For a 14" x 10" lithographic print, suitable for framing, write Aviation Division . . . request Historical Series #1.)

The last sortie of the "Red Knight", Baron von Richthofen . . . on his tail, Captain A. R. Brown in a Sopwith Camel.

Early War Birds— THE SOPWITH CAMEL F-1

By the end of World War I, this British airplane had more victories to its credit than any other type on either side, an estimated 1,294. Powered with a 130 h.p. rotary engine, the Camel had a maximum speed of 113 m.p.h., a climbing rate of 880 feet per minute, and a ceiling of 19,000 feet. Eccentric, easy to spin and with sensitive controls, this snub-nosed plane was the despair of fledglings. Yet, its quickness, tight turning ability, and synchronized twin Vickers guns made it a deadly weapon in the hands of an experienced pilot like Captain Roy Brown.

On a chilly morning in April of 1918 this Canadian veteran, with 18 months of combat, led a flight of 15 Camels over the Somme battle lines, where they soon engaged in a wild melee with a flight of Albatroses and Fokker triplanes. After five minutes of furious fighting, Brown saw a fellow Canadian, Wilfred May, frantically trying to shake a Fokker triplane from his tail. With his guns jammed, May had twisted and slipped downward until he ran out of sky fifty feet over the Somme River.

Brown dove to his rescue, shooting the last of his ammunition at the red triplane and causing it to falter, stall, then glide to earth just in back of the Allied trenches. The red triplane bumped to a stop. In the cockpit, his lifeless hand still on the stick, was the German Ace of Aces, Baron Manfred von Richthofen. The Sopwith Camel had achieved its most illustrious victory.

Phillips 66

● A pioneer in the development of aviation fuels, Phillips Petroleum Company is today a leading supplier of high octane gasoline for commercial, private, and military aircraft . . . and of *super-performance* jet fuels for turbo-props and jets. And Phillips research continues to lead the way, developing new fuels for the aircraft of tomorrow.

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AIR Report

Significant Trends and News

BEECH AIRCRAFT CORPORATION SALES for fiscal 1958 totaled $95,889,733, down from $103,904,870 the previous year, with military aircraft sales of $63,786,164 and commercial aircraft sales of $32,103,569. Net profit after taxes was $3,324,663. Mrs. O. A. Beech, president, said the company is "conducting several research projects for future business airplanes." She continued: "Two prototypes are now flying and show considerable promise for potential sales volume in Beechcraft's fiscal year of 1960. Others are in the preliminary design stage and are aimed at the more distant future. The market for utility and business aircraft is expected to grow and Beech Aircraft should continue to be a dominant factor in this future growth, through improved designs."

CESSNA AIRCRAFT COMPANY SALES for fiscal 1958 totaled $86,159,520, up 23% with military sales of $41,904,051, commercial aircraft sales of $38,230,563 and industrial product sales of about $7,000,000. Net profit after taxes was $4,755,062. President Dwane Wallace said more effective sales efforts by the factory and by dealers as well as expansion of the product line were responsible for a 17% increase in commercial aircraft sales. Wallace expects 1959 sales and earnings to equal or better those of 1958 and commercial aircraft sales should exceed the 1958 level aided by introduction of the 2-place Model 150 and major improvements in the Model 310C twin. "Another addition to the commercial aircraft line is well along in development and further improvement in current models is planned," Wallace said. He expects military volume will probably decline.

DOWNER AIRCRAFT INDUSTRIES, INC., is the new name for Northern Aircraft, which manufactures the 4-place Bellanca and owns manufacturing rights to the Seabee amphibian. J. K. Downer, Saginaw, Mich., is board chairman, and Roy L. Strong is president and general manager.

UMBAUGH AIRCRAFT CORP., Ocala, Florida, has announced signing of an initial contract for production of the 2-place rotary-wing Umbaugh Model 18 by Colonial Aircraft Corp., Sanford, Maine, with the first delivery during January, 1959. The announcement said the contract "calls for the manufacture of an initial 1,000 units" by October 16, 1959. Colonial Aircraft produces the 4-place Skimmer IV amphibian and David Thurston is president. The Umbaugh 18 flies as an autogiro, has a free-spinning rotary wing and a 180-hp. engine with pusher propeller. Raymond E. Umbaugh, president, said it was designed to sell for $9,995, cruises 100 mph., will land at 10 mph. or less in a small space, thus eliminating need for conventional airport lengths.

U. S. MARKETING OF NEW ITALIAN AMPHIBIAN, the 4-place, single-engine, all-metal Fiat-Nardi 333, is planned following CAA certification now nearing completion. Hobart (Bill) Cook, North Lindenhurst, Long Island, New York, visited the Italian factory at Milan in preparation for shipping the first Nardi to the U. S.

NATIONAL PILOTS ASSN. in a nationwide balloting has elected George E. Haddaway, FLIGHT MAGAZINE editor and publisher, as president; A. Bruce Boehm, Short Hills, N. J., first vice president; A. Paul Vance, St. Louis, second vice president; John W. Pocock, Chicago, treasurer and Katherine A. Brick, Norwood, N. J., secretary. Robb C. Oertel, Montclair, N. J., is retiring president.

NEW FEDERAL AVIATION AGENCY took over the functions, funds and personnel of the CAA on Jan. 1 and is headquartered at 1711 New York Ave., NW, Washington 25, D. C. It begins operation with a total of some 28,000 employes including 135 military personnel assigned to it, and with about $365,000,000 of CAA appropriations plus $102,000 from Civil Aeronautics Board funds. Elwood R. Quesada is FAA administrator, with Former CAA Administrator as deputy administrator. In addition to normal CAA duties, the rule making of the CAB and the functions of the Bureau of Research and Development, the new FAA will have ex-

FLIGHT MAGAZINE

JANUARY, 1959 VOL. 48, No. 1

THIS MONTH'S COVER presents the new Cessna 310C for 1959, featuring increased performance including 220-mph. cruising speed from fuel-injected, 260-hp. Continental engines which replace 240-hp. engines formerly used. Exhaust mufflers effectively quiet the 310C's noise, both outside and in the cabin. —(Cessna Photo.)

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager; LOUISE ROBERTSON, Circulation; E. H. PICKERING, Consultant; P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas — Telephone TAylor 3-6191.

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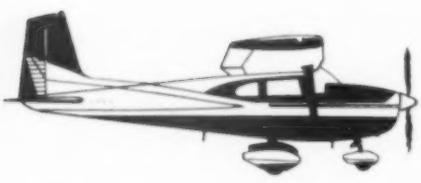
Left to right: the rugged new Cessna 180, high-performance Cessna 182, magnificent Cessna Skylane.

CESSNA'S FASTER AND FABULOUS MIGHTYMI



NEW CESSNA SKYLANE FOR 1959—The mightiest and most magnificent airplane in its price range! And completely equipped with radio and navigational equipment!

Plus new instrument panel... overall 3-color paint job in a new selection of Skylane colors (offering you a choice of many combinations)... distinctive Flight-Line styling for 1959... new streamlined cowling for more speed... maximum recommended cruise: 160 m.p.h. (70% power, 8,000 ft.)... wheel speed fairings... tinted glass in all windows... optional pilot and co-pilot 3-position tilting seats and rear seat ventilation... Land-O-Matic, Para-Lift, High-Stability Wing... and all-metal construction for greater strength, higher trade-in, more economy. Speaking of economy—

The full radio and navigational equipment in the new Skylane is all yours with the inherent advantages of complete factory installation and "package pricing." Total: $17,095 f.a.f. Wichita... for the great new Skylane of 1959... the *complete* airplane for the *complete* pilot.

NEW CESSNA 182 FOR 1959—The bi
gest, brightest, most beautiful airpla
in its price class! Lowest cost in i
class, too!

Features a comfort-engineered
place cabin with many new-for-
features... including a new instrume
panel with shock mounted instrume
group in front of pilot... new ra
location for excellent accessibility
spacious glove compartment... a
new, large *chart case* on the pil

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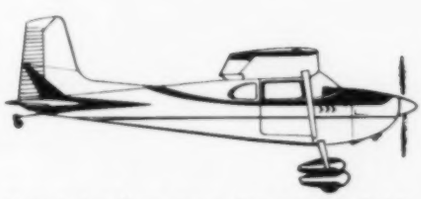
TY MIDDLE LINE...WITH NEW '59 STREAMLINING!

ide. Plus new streamlined cowling... ew Continental 230-h.p. engine–the -470-K–for greater speed and econ- my than ever! Also features Land-O- latic landing gear, Para-Lift flaps, igh-Stability Wing, all-metal con- ruction.

Price: Just $14,600 with std. equip- ment, f.a.f. Wichita. Pilot and co-pilot -position tilting seat, rear seat ven- lation, wheel speed fairings available s optional equipment.

NEW CESSNA 180 FOR 1959–Espe- ially designed for flying conditions emanding sparkling performance, igh dependability, long service life. Maximum recommended cruise: 160 .p.h. Climb: 1,130 ft. per min. Service eiling: 21,500 ft. Spring steel conven-



tional landing gear for rough fields. All-metal construction. New instrument panel. And for greatest handling ease–Cessna's High-Stability Wing ❶,

a *high* wing–the easiest kind to fly (ask any bird... they're all high wing). Plus Cessna's exclusive Para-Lift flaps ❷–much larger than average–for safe, sure, short-field landings and take-offs. Price: only $14,250 with std. equip., f.a.f. Wichita. Also approved for floats.

See the entire Mighty Middle Line at your Cessna dealer's. See all *seven* great new Cessnas for 1959. Call him now for demonstration rides. Also ask about Cessna lease plans. See Yellow Pages of phone book. Or write Cessna Aircraft Company, Dept. FM-4, Wichita, Kansas.

Cessna

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panded enforcement duties and complete control of the airspace, which includes, in addition, the authority over designation of air space reservations for both military and civilian aviation interests. The FAA also has authority to investigate accidents involving aircraft of 12,500 lbs. or less but determination of probable case of each such accident still remains with CAB.

HILLER AIRCRAFT CORP., Palo Alto, has received an Army order for 116 three-place H-23D "Raven" helicopters. . . . LOCKHEED AIRCRAFT has received a $29,654,000 order from Northwest Orient Airlines for 10 prop-jet Electra airliners. . . . FAIRCHILD ENGINE AND AIRPLANE CORPORATION has elected Richard S. Boutelle as board vice chairman and J. H. Carmichael as president and director.

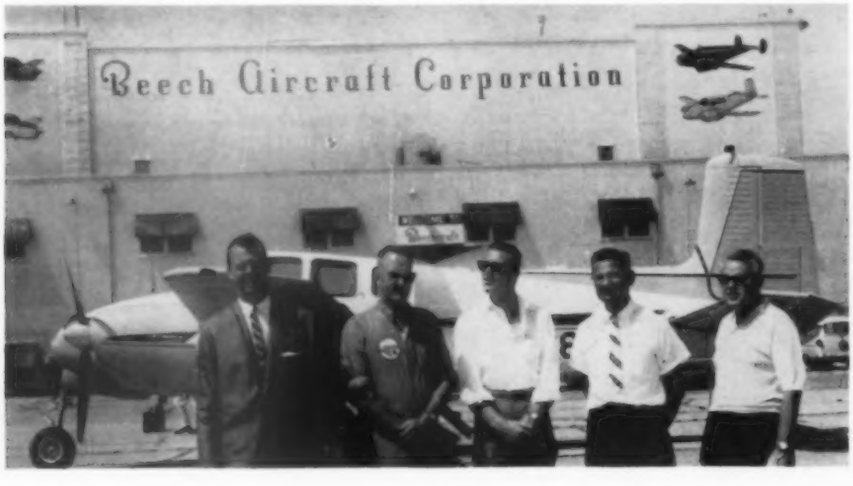
SEVEN NEW TIME-TO-CLIMB RECORDS have been set by the Lockheed F-104, which already holds world speed record of 1,404 mph. and altitude record of 91,243 ft. It climbed to 3,000 meters (9,842 ft.) in only 41.85 secs., to 6,000 meters (19,685 ft.) in only 58.41 secs., to 9,000 meters in 1 min. 21.14 secs., to 12,000 meters in 1 min. 39.90 secs., to 15,000 meters in 2 mins. 11.1 secs., to 20,000 meters (65,616 ft.) in 3 mins. 42.99 secs., and to 25,000 meters (82,020 ft.) in 4 mins. 26.03 secs.

NATIONAL AIR TAXI CONFERENCE, INC., representing 137 air taxi operators, and American Air Taxi, Inc., an individual member firm in Florida, have filed a complaint against Hertz Rent A Plane System alleging the Hertz system is violating the Civil Aeronautics Act by (1) engaging in air transportation without the required certificate of public convenience and necessity, and (2) controlling air taxi operators franchised by it without necessary CAB approval.

JANUARY-NOVEMBER LIGHTPLANE DELIVERIES by nine manufacturers during 1958 totaled 5,820 airplanes billed at $92,039,000, according to the Utility Airplane Council of the Aircraft Industries Association.

NEW SAFE FLIGHT SPEED CONTROL AND TAKE-OFF (SCAT) SYSTEM, which compensates for all variations in gross weight and engine thrust, will provide exact nosewheel lift-off (rotational) control information for shorter runway requirements and will make it possible for every pilot on a fleet-wide basis to achieve standard design take-off performance under all conditions. Developed by Safe Flight Instrument Corp., White Plains, N. Y., SCAT was designed to meet new CAR requirements for jet transports but is applicable for use in all aircraft. A small vane near the wing leading edge, as presently installed on many large and small aircraft for speed control or stall warning, measures lift in response to wing loading, angle of attack and air speed. Forward acceleration is measured by an accelerometer mounted on a gyroscope which maintains it in a forward horizontal direction at all times. Signals from these two sources are added by placing them in series electrically. An indicator mounted on the instrument panel glare shield has a pointer which the pilot centers for proper and design take-off and climb entry. Centering the pointer by correct nose rotation on take-off prevents pilot over-control or overshooting V-2 speed in re-establishing a new climb path when necessary, thus avoiding the tendency to trade altitude for acceleration which has caused accidents immediately after take-off in darkness or under poor weather conditions.

LOCKHEED TEST PILOTS LIKE THE BEECH TWIN-BONANZA so the company recently bought two new D-50A models from Norman Larson, Beech distributor at Van Nuys, and they were picked up in Wichita at the Beech factory by Tony LeVier, Lockheed director of flight operations, and Sammy Mason, Lockheed test pilot. The Lockheed crew is shown below with Marvin (Silent) Small (left), Beech Twin-Bonanza sales specialist.



Cessna
Model 150 . . . two-place tricycle geared high wing airplane for training, rental, pleasure, and general utility use.

Model 172 . . .
Cessna's basic four-place economical business airplane.

Model 175 . . .
Offering the replacement market improved performance in an airplane of medium price.

Model 180
. . . High-performance airplane using conventional landing gear for short, rough fields, and also adapted to use skis or floats.

Model 182 . . .
Tricycle geared high-performance airplane of medium price.

The Skylane . . .
DeLuxe version of the Model 182, offered only as a fully equipped airplane.

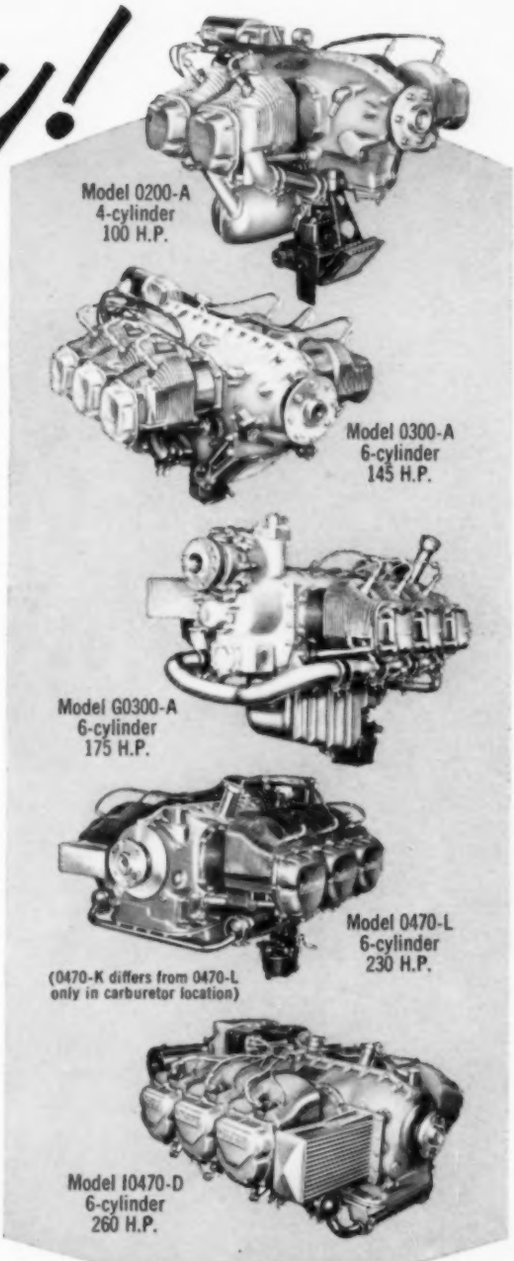
Model 310C . . . Top of the Cessna line, adapted to the needs not only of the individual customer needing a light twin, but to those of fleet users as well. Offered as delivering the finest overall performance in the entire light twin market.

In the Cessna Line it's CONTINENTAL

...All the Way!

• The owner of every Cessna airplane benefits not only from its builder's unsurpassed experience in airframe design and construction, but also from Continental's pre-eminence in the field of aircraft power. All seven models in Cessna's line, from the economically-priced 150 to the 5-place twin-engine 310C, offer the plus value of the engine that has long been pilots' first choice. Continental has earned this preference solely on the basis of performance. Today, as in the past, every major flying record* at the utility aircraft level is Continental-held.

*The latest is that established by Jim Heth and Bill Burkhart, at Dallas, in their Cessna 172 with Continental O-300-A engine. They stayed aloft from Aug. 2 to Sept. 21, 1958—1,200 hours, 16 minutes—flying a distance equivalent to four times around the globe. Both the record they broke, and the one before that, were set by planes with Continental power.



Model 0200-A
4-cylinder
100 H.P.

Model 0300-A
6-cylinder
145 H.P.

Model G0300-A
6-cylinder
175 H.P.

Model 0470-L
6-cylinder
230 H.P.

(0470-K differs from 0470-L only in carburetor location)

Model I0470-D
6-cylinder
260 H.P.

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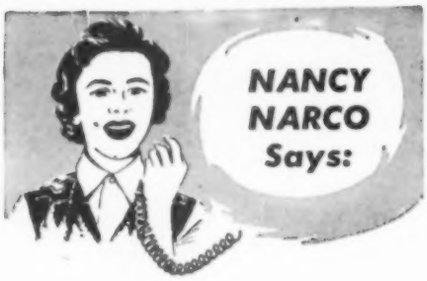
CONTINENTAL MOTORS — Powerful as the Nation — AMERICA'S STANDARD



FAT

Surprising how clever lots of us are at really lousing up the proper operation of good radio equipment with silly errors or improper procedures. For instance:

1. *Right Frequency?* Probably the most common mistake is leaving your transmitter on tower frequency and trying to call a range station en route. Before you press down the mike button, make sure you're on the proper frequency.

Best thing is to anticipate your communications requirements and set your transmitter on en route frequency, such as 122.1, as soon as you are cleared from tower frequency.

2. *Proper Transmitter Selection?* With more and more aircraft equipped with two or more transmitters, be sure your selector switch is set for the proper transmitter. You don't get very far calling a range station on ground control frequency!

3. *Properly Tuned?* If you're working a tower, and don't have crystal or "whistle-stop" tuning, make sure you're tuned to the proper tower before you call. Again, anticipate your requirements. Start tuning in the tower well in advance of your first call-up.

If you're en route be sure you specify the frequency you expect a reply on — especially if it's 122.2, 126.7, or the new 120.7 frequency.

4. *Audio Properly Set?* If you have a multiple installation, you probably have a centralized audio function control, such as the Narco Switchmaster, which permits you to put any of your radios on cabin speaker, headphones, or stand-by, meaning no audio. It's really easy to forget about this one — you can call all day and never receive a reply if your receiver is on stand-by. That goes for aural marker beacon receivers, too!

So here's a suggestion — just remember the word FAT and go through this simple check before making any transmission:

F for frequency — check proper channel and transmitter selector switch.

A for Audio. Check receiver volume and audio function switch to be sure you can hear OK.

T for tuning. Be sure you're tuned properly.

Just remember FAT and maybe you won't cuss at your radios so frequently.

Yours,

Nancy

NARCO • Fort Washington, Pa.

Any frequency they want...

...you've got!

with the narco Mark V

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Phoenix, Arizona

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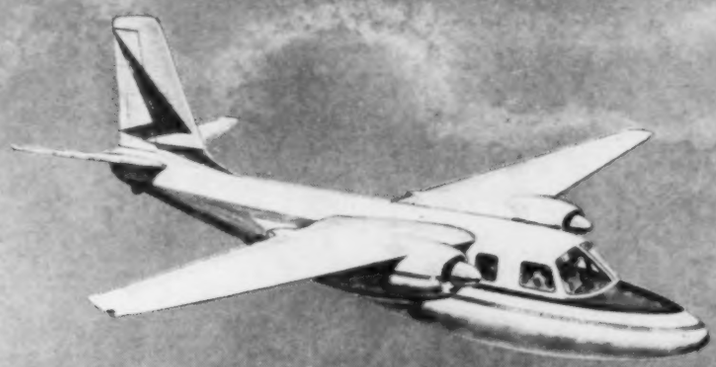

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Compass Course For '59

IT'S a good old American custom to take pause at the New Year and consider just where we are going in the light of where we have been. In an industry as dynamic and explosive as aviation it is difficult to know where to start and where to end in establishing a workable compass course for the New Year. But we shall try.

The most significant development this year, of course, is in the new Federal Aviation Agency and the new leadership U. S. aviation is to be governed by. By mandate of Congress last year the new and powerful Federal Aviation Agency has absorbed all the people and functions of the Civil Aeronautics Administration and certain former safety functions of the still independent Civil Aeronautics Board. The FAA is now going through the throes of complete reorganization of our Federal air agency set-up. Every action they take, every decision they make will have a far-reaching effect on everyone who has anything to do with aeronautical enterprise. This year is one of the most pivotal in all aviation history.

The new FAA is the epitome of centralized Federal control. Most airmen will not take issue with the basic philosophy and traditional concept that the air should be national and that the airplane could never have flown out of swaddling clothes had it not been for this fundamental policy of Federal control instead of state control. But powerful and total Federal control never has been and never will be the complete answer to aeronautical progress. Without intelligent leadership such authority can actually strangle and hold back the very industry it is supposed to sponsor and develop. Ever since the first Federal Aviation Agency back in the 1920's we have seen periods of retrogression due to myopic and incapable leadership.

What all of us must realize is that aviation progress can come only through enlightened leadership in government working with enlightened leadership in industry. U. S. aviation history is replete with classic cases where industry leadership and industry pressure forced incompetent leaders in government to mend their ways and by the same token there are many incidents where government officials had to soundly rap the knucks of self-seeking opportunists within industry. No holier-than-thou industry, aviation has had its frauds and gyps and criminals. There are still a few around.

Our big fear at the beginning of the New Year is that the FAA, which is Big Government personified, might be too big and too powerful and end up losing the common touch. Our greatest hope for the New Year is that no stone will be left unturned to create and strengthen every possible liaison between the FAA and the industry. Since World War II aviation growth and diversification have produced a large number of segmented interests so that it is difficult for any Federal agency to maintain liaison with all of them. It is therefore incumbent on the industry to establish the right kind of machinery for efficient and productive contact with the FAA and insist that this machinery be used so that the industry will have something to say about policy, procedures, regulation and systems under which we all must operate. Otherwise we'll be headed straight as an arrow for all kinds of trouble in the future. The monkey is squarely on industry leadership's back.

Too bad there is no crystal ball all of us in aviation can look into and predict the future. But we have something actually a lot better than a crystal ball — we have the experiences of the past to draw upon and the record is mighty clear on what we have done wrong in the years gone by from sheer ignorance, from neglect of duty and from pure apathy. It's quite clear also that the FAA is flight planning a compass course and is well on the way. But unless industry leadership has some say in the matter the air is going to get mighty rough.

Frauds In Space

THIS magazine's interest and efforts are devoted to down-to-earth aviation — airplanes with ordinary people in them. Great strides have been accomplished in perfecting our kind of aviation and even greater progress lies ahead. But scientists and Sunday supplement experts are clouding the public's and even the industry's concept of aviation with sensational talk of "space" travel. Missiles and satellites and even moon-shoots are fascinating and very real, but space travel is so visionary it becomes confusing and even misleading. In fact, we believe much of the space talk is fraudulent.

How far is space? The farther our studies go, the more meaningless become familiar measurements. Astronomers are space men and they speak of distance in terms of "light years." This has been glibly applied by opportunists and promoters to space "travel," although no mass has yet attained the speed of light. At 186,000 miles per second, one single light year equals 5.8 million million miles of distance. This, then, is "space."

The moon is relatively close to us at 240,000 miles — only about 8-10 hours away for a missile. If some miracle made it possible for a vehicle to attain the speed of light, it could reach the moon in a mere 1.3 light seconds. Even without performing a miracle, man might soon orbit the moon and even land on it. It is possible. But the moon does not represent "space" — and neither does Venus, 26 million miles or 6 light minutes from the earth. Then there is the sun, 8.3 light minutes off, and Mars at a distance of 12.5 light minutes. Pluto is many times farther removed at a distance of 5.5 light hours. Its mileage doesn't mean much but the travel time does — a space ship moving at today's supersonic speeds would require not days but years — 50 years — to reach

Pluto. This ship's occupants wouldn't live long enough to complete the return trip.

But Pluto is not really very distant as space goes — it is not even outside our own solar system which, with its planets, remains but a tiny element in the Milky Way. We don't reach outer space until we go beyond the farthest fringes of the Milky Way, which is our galaxy. There are uncounted galaxies in outer space — thousands like the Milky Way. Each galaxy is separated from its neighboring galaxy by an average of 2 billion light years.

The next time you hear someone refer to "intergalactic" space travel to outer worlds, remember the distances involved. Such space talk becomes fraudulent in the enormity of space. At the speed of light a magic space ship would have to travel 15,000 light years just to cross the Milky Way's nearest frontier before it could depart our own galaxy and begin a true "space" exploration.

No human mind is capable of conceiving space distances among the galaxies. To claim limitless distances by weapon or vehicle is sheer, unholy fraud — the most monstrous fraud ever perpetrated on the human race. Our eyes can see literally beyond our mind's grasp and our missiles' reach. The outer universe beyond our own solar system belongs to astronomers and their telescopes — the 200-inch Hale telescope enables them to see from the earth as far as the Cone Nebula, 20 million light centuries removed from reality!

But enough of this. Let's concentrate our efforts on more credulous undertakings in down-to-earth aviation potentialities, on aircraft with people in them accomplishing work-a-day tasks in our own element. Scientists can dream but let's not fall prey to the simple fraud of confusing travel with metaphysics and rocketeers with miracle makers.

By Pilots For Pilots

WE would like to pay tribute to a regular guy who has spent a lifetime in the flying game and who just recently put in two hard years of getting a relatively new aviation organization off the ground into good solid, stable air. We refer to Robb C. Oertel, aviation sales manager of the Esso Company, who has just wound up two constructive years as president of the National Pilots Assn.

Nearly everybody who has been around in this business for any length of time either knows Oertel personally or by reputation. So a review of his fabulous aviation history since his days as a pilot in France during World War I isn't necessary at this time. The organization he so successfully directed from the incubator stage to the position of a respected and solidly run outfit with an office and full time secretary-manager in Washington looked like a losing proposition before he took over. The National Pilots Association is a non-profit outfit. And though hard to believe, NPA is the first organization of pilots this country ever had which is membership owned and controlled. You vote in NPA and as an individual member your voice is as loud and as important as the next guy's. Since the organization has had to pull itself up by its own bootstraps there haven't been loose funds around with which to ballyhoo for memberships or create a lot of notoriety which seems to be the modern way to attract people.

Under Oertel's capable and realistic leadership NPA hasn't had to go the promotional route to succeed. As a result it is making up in quality what it might lack in large numbers. You will hear more and more of NPA in 1959. And for those of you who like to vote in what you belong to, who want to affiliate with an outfit run by pilots for pilots, we suggest you write NPA headquarters at 1025 Connecticut Avenue, N. W., Washington 6, D. C., for some literature. Thanks to Robb Oertel, NPA now proudly stands alongside the other fine aviation organizations who represent other specialized interests in the field of civil aviation.

WELL DONE, BILL! That was the message from National Aviation Trades Association members to Bill Lotzer, president of NATA, when it presented him with the deer rifle being admired in the photo above by G. B. Van Dusen of Van Dusen Aircraft Supplies. Presentation was at NATA's annual banquet recently in Milwaukee, which drew the largest attendance in NATA history. Left to right in the photo, which was made by Sig Gudmundson of Van Dusen Aircraft Supplies in Minneapolis, are: George Galipeau, Van Dusen Aircraft Supplies; Honorable James R. Durfee, Civil Aeronautics Board chairman, Washington, D. C.; William T. Piper, president of Piper Aircraft Corporation; Bill Lotzer, who received the rifle and other honors; and G. B. Van Dusen. Durfee was the guest speaker at the annual banquet.

Airmen's Calendar

Jan. 19-21—11th Annual Convention, Helicopter Association of America, Villa Hotel, San Mateo, Calif.

Jan. 19-Feb. 6—Aviation Institute for Business Pilots and Commercial Carriers, University of Southern California, Los Angeles.

Jan. 21-22—Agricultural Aviation Conference, Purdue University, Lafayette, Indiana.

Jan. 26-27—Association of Local and Territorial Airlines Annual Meeting, National Aivation Club, Washington, D. C.

Jan. 26-29—27th Annual Meeting, Institute of the Aeronautical Sciences, Sheraton Astor Hotel, New York.

Feb. 21-22—13th Annual Pacific Coast Mid-Winter Soaring Championship, Torrey Pines, San Diego.

March 31-April 3—National Aeronautic Meeting, Society of Automotive Engineers, Hotel Commodore, New York.

April 12-19—World Congress of Flight, Air Force Association, Las Vegas, Nevada.

May 4-7—5th Annual Flight Test Instrumentation Symposium, Instrument Society of America, Olympic Hotel, Seattle, Wash.

May 20-22—2nd Annual Jet Age Airport Conference, ASCE, Shamrock Hilton Hotel, Houston.

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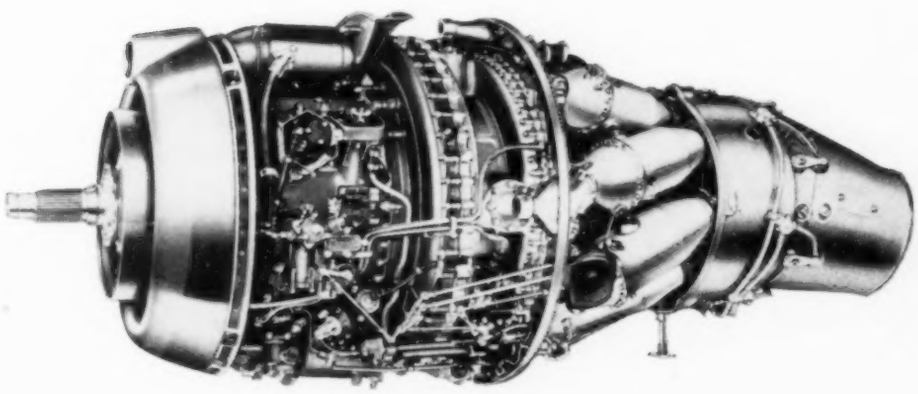

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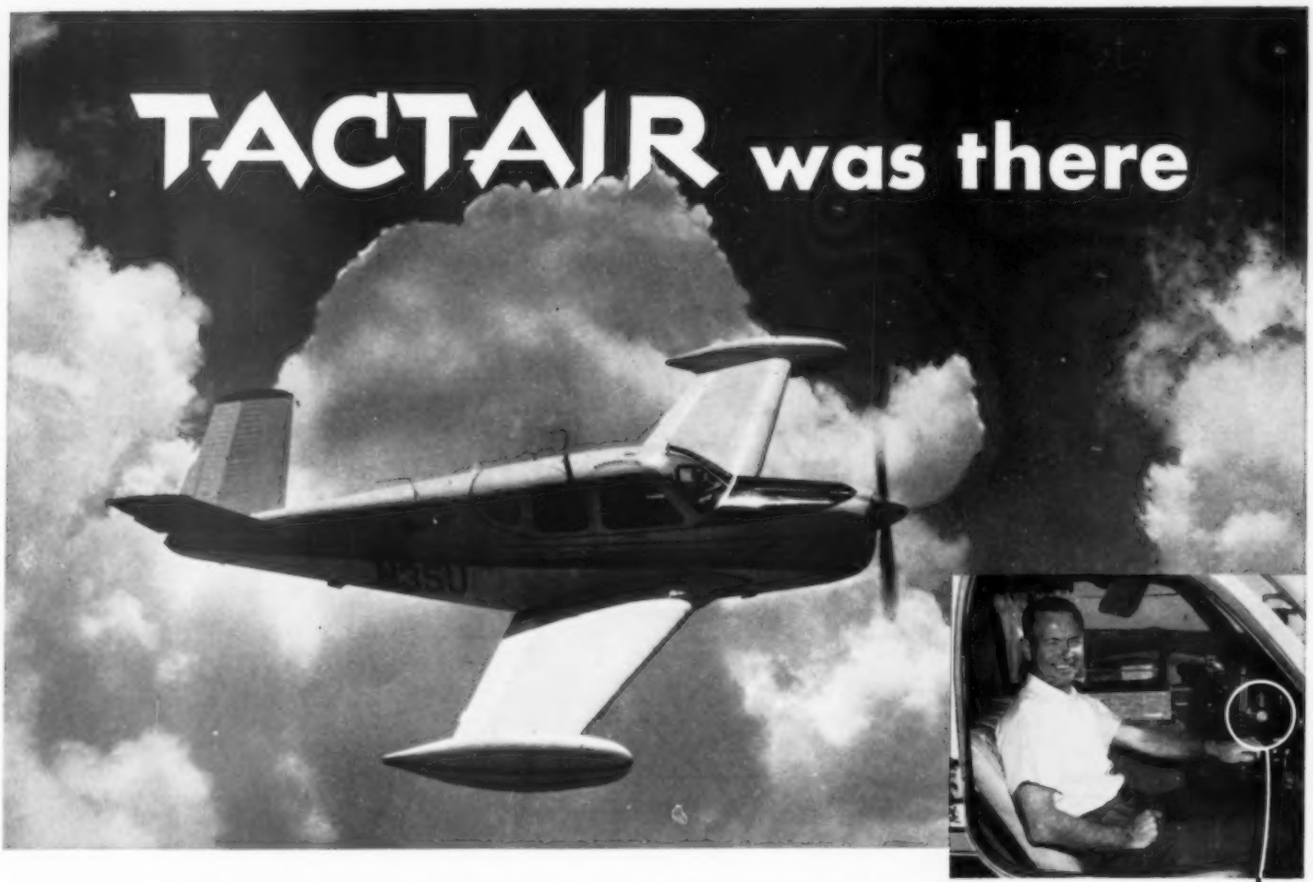

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"Couldn't Have Made the Flight Without It."

"When the question of an automatic pilot came up, both Beech and I were concerned with only two things—weight and dependability. That's why we chose the Tactair. I was also impressed by the fact that we didn't have to depend on any electric circuit to keep it operating.

"Both on the trip out to the Philippines and on the 46-hour non-stop flight, I used the Tactair constantly—102 hours total without a quiver, without any adjustment needed.

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TAIL HEAVY. Ever try to take off with a couple of bags of cement on your tail? Well rain can cause you the same kind of trouble when it seeps in and collects at the tail-end of your fuselage. Wing Tip: when the weather's wet, check the fuselage inspection holes for signs of water and ice.

FUELS. Esso Aviation Gasolines are carefully balanced to give your engine the utmost in power and economy. Moreover, they have a reduced lead content – far less than the maximum allowed by government specifications – which means less spark plug fouling and fewer engine deposits, with increased life of engine parts. So next time – be sure you get the most from your engine, be sure you get Esso Aviation Gasoline!

REMEMBER: For Happy Flying . . . look for the Esso Sign, trademark for 600 dependable Esso Aviation Dealers.

SEND IN YOUR TIPS! Every pilot has his own special set of safety tips, and undoubtedly you have some that would be of interest to other pilots. Why not write up a couple – in about the length of the ones on this page—and mail them to: Esso Wing Tips, Room 3170, Esso Standard Oil Company, 15 West 51st Street, New York 19, N. Y. Any tip will be warmly appreciated. And if published . . . you'll get full credit in the ad.

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Low ceilings kept us down on the deck but this was both practical and enjoyable and our new 310C scooted along nearly 500 miles of uninterrupted beach south (left, above) of Brownsville to Vera Cruz and back again (right).
—(FLIGHT MAGAZINE Photos.)

High Performance In Comfort

By TOM ASHLEY

THERE'S something about Mexico which draws us back year after year when cold weather arrives. The land of *mañana* beckons with sunny skies and warm breezes. It's fun to scoot low along a broad beach on the Gulf of Mexico and its gentle surf — it is also practical when the ceilings are low. There's exhilaration in cosmopolitan Mexico City's altitude and sparkling weather. Fishing is nearly always good on Mexico's west coast. Scenic mountains are a dime a dozen in the republic's interior and include towering volcanos with permanent ice caps.

But the most enjoyable part of our latest junket south of the border was the flying part of it — it was a hurry-up trip just to see what Cessna's new 1959 310C twin is like. The big, wide beaches were there but the weather was lousy for December. Usually sunny at this time, Mexican skies were practically down on the water and very drippy — a record cold front had failed to stop before it reached Brownsville and kept right on rolling far past Vera Cruz a few days ahead of us. It not only clabbered the warm moist air but actually kicked up a hurricane which was rough enough to knock holes in sea walls and to take the usual toll among shrimp boats too far out in the Gulf to find safety.

Even if we were forced to stay on the beach as we winged south, however, we were able to go as far as Vera Cruz. We didn't care to turn to the right and cross the high mountain ridges in all the stormy cumulus we saw piled up against them — Mexican thunderstorms grow huge hail. Besides, we had only one day and two nights to spend and we knew we could always scoot back up the beach even if the low ceilings stayed, which they did.

This knocked us out of taking the 310C to altitude, leaning its new fuel-injected 260-hp. Continental engines way out for peak efficiency, and obtaining some nice cruise figures to discuss. But we learned long ago to make the most of whatever conditions we might encounter and enjoy ourselves. This is easy to do in the new Cessna twin — well respected for its performance ever since the first 310 came out five years ago, the C model has more of everything. We feel it is going to make quite a name for itself during the next twelve months, for many reasons, nearly all of them having to do with performance.

One remarkable feature of the 1959 Cessna 310C is the way Cessna was to hold its price to the same as that for the preceding B model — $59,950. It is difficult to imagine an aircraft manufacturer not kicking the ante when he comes out with so many improvements as Cessna packed into the new model. Fuel injection was added, for example. Not only that, but these new 6-cylinder Continental IO-470-D engines are rated at 260 hp., each, up 20 hp. each over last year's carburetor-equipped — we should say carburetor handicapped — 470's. At no increase in price, Cessna gave the 310C more power and freedom from carburetor problems such as icing — it can fly all day in humid air such as we were in with no possibility of carburetor ice.

Other advantages of fuel injection include more efficient mixture leaning and more efficient combustion, plus more engine smoothness. This improvement in smoothness is especially noticeable in a light twin such as the

We balanced cigarets and coins on the card table at 220 mph., so smooth was the Cessna 310C — its cabin is nearly as free from vibration as are the cabins of the new Boeing 707 and Caravelle jet airliners in which we have also balanced cigarets and coins on edge.
—(FLIGHT MAGAZINE Photo.)

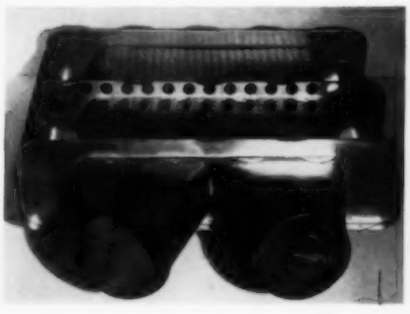
Flight to Mexico demonstrates many new features of new Cessna 310C with more power, fuel injection and plenty of speed and climb

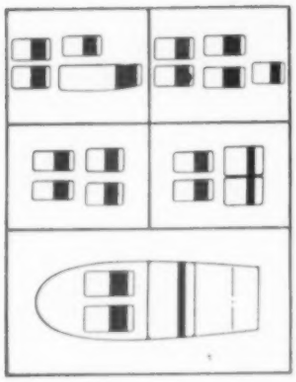
310C because engine roughness really becomes intensified when two motors are shaking away. The factory demonstrator we were in, along with Bill Ferguson and Bob Chatley from the factory, had a deluxe interior which included a neat little card table fastened to the back of the copilot's seat. We first noticed the lack of vibration while playing cards — even though we were using a new deck, the slippery cards didn't want to slide off but just stayed on the highly-waxed table surface when we played with them. Thus impressed, we were reminded of the smoothness of jet flight on some trips we made last year in the new Boeing 707 and the Caravelle from France. So we began balancing cigarets and coins on the card table — just as easily as we had been able to balance them aboard the super-smooth jet airliners. Despite the pounding pistons in the two Continentals, the Cessna 310C's cabin is almost as free from vibration and shaking as were the cabins of the Boeing 707 and the Caravelle with their super-smooth rotary jet engines.

Just as impressive is the success which Cessna achieved in quieting the 310C. It did this by installing Convair-like mufflers on the engine exhaust augmentors, by increasing windshield thickness and by better cabin soundproofing. All previous 310's have been objectionably noisy for the simple reason that Tom Salter, Cessna's engineering genius, wanted the flattest possible low-drag engine nacelles and the only way he could get them was to dump the exhaust atop the wing. Convair dumped it the same way at first but finally came to mufflers. Now Tom has added mufflers, too, and sure enough, it worked for him just as it did for Convair on the 440. This was the first

Here's the 310C's new exhaust muffler on the right-hand engine as it appears from the rear seat in flight. It not only quiets the exhaust but carries it back to the wing trailing edge behind the cabin. New mufflers plus advanced soundproofing have quieted the 310C's cabin and fuel injection has made the engines smoother.
—(FLIGHT MAGAZINE Photo.)

Cessna muffles exhaust noise on the new 310C with a perforated inner liner for the augmentor box (left, below) and a layer of fiberglass (right) between it and the outside cover.





Five seating options are available in the new Cessna 310C, as detailed in the sketches. Our trip was in a demonstrator with the couch, as pictured. Couch has two seat belts and may be reclined to sleep a six-footer in comfort.

310 trip we ever made without headaches and aspirin, thanks to the new mufflers. They also quiet the noise outside the cabin. The mufflers extend back to the wing trailing edge, which is just about at the rearmost point of the cabin. Thus the noise is not only muffled but is always behind the cabin.

The extra power gives the 310C more performance. Cruising speed is at least 6-8 miles per hour more than it was on the B model. On our trip, we cruised it consistently at 219-220 mph. using only 65% of power while the manual claims 220 mph. for 70% of power — altitude being 8,000 ft. At 8,500 ft., for example, with outside air temperature of 50 degrees, we indicated 189 mph. using 22.5 inches and 2,300 rpm., for a true air speed of 220 mph. on 65% power. Again, at 9,500 ft., pulling 21.5 inches and 2,350 rpm. for 64% power with outside air at 50 degrees, we indicated 187 mph. for a true air speed of 219 mph. In both cases our fuel consumption was running a little less than 25 gals. per hour. This is outstanding for an airplane scooting along at 220 mph. It is more than the fuel consumption of the B model doing 213 mph. on the same percentage of power but the truth is that the 310C is using more horsepower because its engines are rated higher.

A 220-mph. cruise speed means that the C model 310 can be counted on to make good better than 205 mph. ground to ground the year around, no matter what heading it is following or what the winds happen to be. Some trips will be 195, others 230 but the average will be 205-210. The airlines learned back in the DC-3 days that they had to discount 10 mph. from all trips for wind factor to find an average and this still holds true for airplanes flying at 8,000 to 10,000 ft., as the 310C does. On 25 gals. of fuel or less hourly, that's excellent performance. With 12,000 ft. or more of altitude, less power can be used for less fuel consumption and then the 310 really does perform. With economy power, cruising at about 170-175 mph. on less than 50% power at 10,000 ft., fuel consumption can be chopped down to about 17 gals. hourly or less. This will give the 310C a range of about 1,100 miles on 100 gals. of fuel, which is standard, or about 1,400 miles on 130 gals., with auxiliary tanks.

No airplane will deliver the high speeds and efficiency of the 310C without a power loading that is its equivalent or better. The C model's gross weight has been increased to 4,830 lbs. (the 310 started out at 4,600 lbs. gross) but the added power in the engines still gives it a good power loading of only 9.3 lbs. per horsepower.

At gross weight of 4,830 lbs., the 310C will climb from sea level at 1,800 fpm., which is really getting upstairs in a hurry. This is at 119 mph. At 10,000 ft., it will still climb better than 1,000 fpm., and it will climb through the 15,000-ft. level at better than 600 fpm. The nice thing about this is (1) the 310C will get up and go from high-elevation fields or for quick altitude changes while en route, never being doggy, and (2) such phenomenal ability gives it a cruising climb which really gets the trip started with fast mileage. We had no trouble at all climbing out at 1,000 fpm. at gross weight while indicating a fast 155 mph. — we got to 8,500-ft. cruising altitude on two occasions within 10 minutes, our 155-mph. dropping to 140 IAS at the top of the climb.

Where the 310C's performance really pays off is in an emergency with one engine feathered. At gross weight, it has the highest single-engine rate of climb of any twin — 440 fpm. at sea level, 310 fpm. at 2,500 ft., 185 fpm. at 5,000 ft. and 108 fpm. at 7,500 ft. At lower weights, these figures are greatly improved, being 550 fpm. at 4,400 lbs. from sea level and 425 ft. at 4,400 lbs. from 2,500 ft. Its 7,700-

(Continued on page 48)

We banked around this air strip for flying sportsmen just north of Tampico, operated by Francis MacDonald, retired Texas executive pilot who has survived many hurricanes and offers excellent river fishing and jungle hunting to fly-in guests. Gentleman Mac's main strip is on mainland just across river and barely seen to left of center. He commutes between camp and Brownsville in a Cessna 180.
—(FLIGHT MAGAZINE Photo.)

Latest version of the STOL Helio Courier is this Super Courier powered by a 295-hp. Lycoming engine and seating 5 occupants with a useful load of 1,000 lbs. at a 3,000-lb. gross weight. Its high-lift devices give it a speed range of 30 to 170 mph. and it will take off or land over a 50-ft. obstacle in less than 500 ft. with no wind, or half that distance with 18-mph. wind. It is priced at $34,000.

New 295-hp. Super Courier

A new 5-place version of Helio Aircraft Corporation's STOL (short take-off and landing) business and industrial Courier has been announced, powered by a 295-hp. Lycoming engine and described as "the world's fastest, longest-range, most efficient load-carrying plane which is also capable of attaining helicopter-like STOL performance."

Known as the Super Courier, it has a speed range of almost 6 to 1, which is the greatest of any business plane on the market — it will cruise at 170 mph. on the high end of the speed range and will fly as slowly as 30 mph. on the low end.

The Super Courier's STOL capabilities enable it to take off or land over a 50-ft. barrier in less than 500 ft. with zero wind at sea level. With an 18-mph. wind, this distance is more than halved, enabling the high-performance airplane to operate from clearings no longer than a 100-yard football field.

Over 100 standard models of the 4-place 260-hp. Helio Courier are in operation as the only CAA-certificated STOL business plane manufactured in America. This version, now in its sixth year, is produced by Helio at Pittsburg, Kansas, and sells for $29,600. The new 295-hp. Super Courier is priced at $34,000.

Full details of the Super Courier were not included in the company's announcement, but it has a 1,000-lb. useful load when normally operated from a 400-ft. STOL area. When operated under CAR Part 8 for certain industrial, agricultural or other specified purpose, it can carry up to 1,900 lbs., or about the equivalent of its own empty weight. The 260-hp. version has a normal gross weight of 3,000 lbs.

Lynn Bollinger, president of Helio Aircraft, which headquarters in Norwood, Massachusetts, said the 295-hp. Super's basic airframe is the same as that of the standard Helio Courier, which has an unmatched safety record and has never been handicapped by a single mandatory CAA bulletin on a ground-til-comply basis.

The Super Courier's 295-hp. Lycoming has a 3-blade, 96-inch Hartzell constant-speed propeller. It also has a double-curvature, flush-riveted cowling for improved visibility over the nose and less frontal area. Bollinger said it cruises 10 to 22 mph. faster than the 260-hp. Courier. Its cabin compartment is 23 inches longer and detail refinements include a steerable tail wheel for easier cross-wind taxiing.

Optional equipment includes cross-wind landing gear with a locking device. This innovation enables the pilot to select at will either castering or fixed-direction wheels for landing or take-off.

"The new Super Courier is the largest, most powerful single-engine airplane produced commercially in the United States," Bollinger said. "It stands unchallenged as the fastest, most efficient STOL airplane in the world."

Both 260 and 295-hp. Couriers feature high-lift devices in their design. These include full-span leading-edge "eyebrow" slats, which automatically extend forward at high angle of attack for low-speed boundary layer control in conjunction with large trailing-edge flaps. An "interceptor" spoiler device behind the slats also automatically operates with full aileron travel to provide maximum control in high cross-wind at low speed. The horizontal elevator is a one-piece, wide-span "stabilator."

Also featured are patented engine exhaust augmentors and mufflers.

Described as stall-proof, the Courier is fully controllable at slow speeds down to just below 30 mph. and below that it just mushes down in a sink. With engine failure at 1,000 ft. above the ground, it is said to have a gliding range covering 12 square miles at a rate of sink described as less than that of a parachute. Nobody has ever been seriously injured in a Courier, it is said.

The standard Courier has a 3,000-lb. gross weight, 1,965-lb. empty weight, and 1,035-lb. useful load. Its fuel capacity is 60 gals. plus a 25-gal. optional auxiliary tank, range with 60 gals. being 700 miles maximum. Span is 39 ft., length 29 ft. and height 8 ft. 10 ins. It is an all-metal airplane of tubular steel structure. The cabin has two doors, one on the left for the front and one on the right for the rear. A large baggage compartment behind the rear seat has 200-lb. capacity. The Courier is available on wheels or floats.

Clinton Aviation's busy ramp is shown in this air view of a corner of Denver's Stapleton Airfield. Clinton hangar is left of center.

Service And Sales Go Together

NEW airplane delivery figures for 1958 again show Cessna's top position. Three factors largely responsible for Cessna's supremacy are (1) the company's intensive sales promotion campaign, (2) a large variety of models for every purse and purpose, and (3) a constantly improving distributor and dealer organization.

Typical of Cessna's rapidly growing sales and service institutions is Clinton Aviation of Denver, now winding up twelve successful years with the Cessna franchise — after a hungry first-year in business petitioning for the Cessna account. Established right after the war by Lou Clinton and Grant Robertson, the newcomers had to compete with fifteen other outfits in making a successful bid for their distributorship. Lou worked for Caterpillar Tractor and owned a Culver Cadet. Grant was a World War II flight instructor and an advertising agency executive by training and profession. It was a natural hook-up between the two, as both were firmly convinced that utility airplanes were destined for wide use in business and agriculture. They knew the latent market was there and the only ingredient missing was enough salesmen to take their story to prospects — that the only way to go anywhere was by private airplane. They soon discovered they were right.

An analytical advertising man, Grant Robertson made a market study on his own, figured out the ratio of pilots to airplanes in the proposed territory and decided where the company should sign up dealers if they

There's a salesman on the Clinton showroom floor at all times and informal sales meetings are held daily. Left to right in the photo at left below are Lou Clinton, Bert Briney, Lou Lyon and Rick McCoy. Sales Manager Grant Robertson is shown in photo at right between Frank Martin, marketing manager, and Bob Chatley, sales promotion manager, both of Cessna.

nailed down the Cessna distributorship. When Cessna's erstwhile commercial sales manager, Don Flower, asked Grant how many airplanes they thought they could sell, Robertson gave him the figure as being 175, dating from March of 1946 to the end of 1947. At the end of the period, Flower telephoned Robertson and said he had to have an order from Clinton for three more airplanes. Robertson asked why, and Flower jovially reminded him that Clinton had sold 172 airplanes, all right, but had estimated they would sell 175.

Ever since then, Clinton Aviation has been among the top ten Cessna distributors and quota busters. Clinton's territory comprises the states of Colorado and Wyoming plus eight western counties in Nebraska and the "uranium" corner of Utah. This area has experienced explosive growth since Clinton opened shop on Denver's Stapleton Field shortly after the end of the war.

This airport thirteen years ago was primarily an airline operation and a veritable desert as far as business aircraft sales were concerned. Today, business aviation has blossomed into full flower there, thanks to such companies as Clinton and Coombs Aviation, who have continued to expand apace with the area and in direct proportion to the needs of the airplane owners, both home-based and transient.

During a recent visit to Clinton, we found out just why the company stays among the top ten Cessna outlets of the nation, despite the relatively low total population in their over-all territory. When Lou Clinton and Grant Robertson started out, they hadn't been told you can't sell airplanes by calling on cold prospects.

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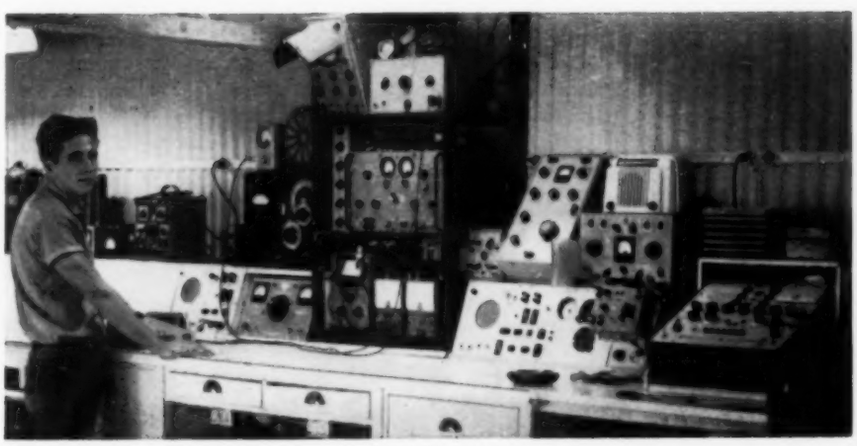

Denver Airplane Supply Salesman George Shearer (top right) covers territory in Cessna 182. Keith Natzke (right) is chief technican in Clinton's complete radio shop. Service Manager Murlin Nichols and his assistant, Cliff Cunningham, are shown with a jigged Cessna 140, Showroom (bottom) displays six planes. That's Salesman Bert Briney with Customer Ot Longhenry, Gaddis Mining's pilot.

Smallest of all light twins, here's prototype of Mooney Mark 22, which will be produced in 1960 with 3,250-lb. gross weight, two 180-hp. Lycoming engines and cruising speed of over 210 mph. claimed.

More Business, New Models For Mooney

HAVING crossed the hump of business probability the year before when it netted its first profit, Mooney revved up a record volume of business aircraft sales in 1958 and is off to a fast start in 1959 for a goal more than tripling its sales of 1957. Mooney sold $1,003,386 worth of business planes in 1957, over $1,700,000 worth in 1958 and is geared to go over the $3,100,000 mark in 1959.

This success story sparked the firm's recent annual sales meeting at the factory in Kerrville, Texas, where production facilities have been expanded 30% over the last year and personnel has been increased from 100 to 213 employes. Hal Rachal, president, plans to average 1 airplane per day in production to deliver 250 or more airplanes during 1959.

His dealers pushed the new year off to a healthy start by taking home $500,000 worth of new Mark 20A 4-place Mooney's from the sales meeting, attended by 165 persons including 40 distributors and dealers plus all suppliers and key factory personnel.

A sparkling new sales contender this year will be the Mark 21, powered by a 250-hp. Lycoming 0-540 engine, as contrasted to the 180-hp. Mark 20A. The Mark 21 was demonstrated during the sales meeting and showed all of the zip and go which had been expected of it. Because the Mark 21 will not enter production until July this year, complete details were withheld. But the powerful 4-place will cruise more than 200 mph.

Mooney officials also demonstrated the experimental prototype of their new small twin, the Mark 22. Built up with major components from the single-engine Mark 20A, this speedster is powered by two 180-hp. Lycomings and grosses only 3,250 lbs., its 360 hp. giving it a power loading of only 9 lbs. per hp. It will cruise over 210 mph. with that kind of loading. As the smallest of all twins, the Mark 22 is expected to sell for less than any twin — Mooney is shooting for a sales price of less than $30,000. Rachal has emphasized, however, that this is a 1960 airplane and that numerous changes can occur between now and the time during 1960 when it will become available.

Mooney's stock in trade right now is the popular 180-hp. 4-place Mark 20A, priced at $14,850 and featuring numerous improvements for 1959. Described as a deluxe high-performance business plane sold as a standard production model, the Mark 20A features a cruising speed of 180 mph. and a range of up to 1,000 miles.

Two new experimentals were demonstrated at Mooney's annual sales meeting —the single-engine 250-hp. 4-place Mark 21 and the Mark 22 twin.

New standard equipment features of the 1959 Mark 20A introduced at the annual sales meeting include (1) tinted and heavier glass all around for better soundproofing and reduced eye strain in bright weather; (2) full windshield defrost system; (3) new airline-type W-shaped control wheel, giving full view of all instruments and controls and switches on the panel; (4) new toe-brake pedals; (5) chromed flap and gear handles — the Mooney features manually-actuated flap and gear; (6) new ventilation system with individual air outlets for each passenger; (7) new "jet-swept" paint design; and (8) a new retractable entry step, operated by two turns of a recessed crank.

Rachal announced at the meeting that a separate company had been formed to handle the world-wide distribution of Mooney airplanes. It is the Mooney Sales Company, with Norman F. Hoffman as president; R. S. Martin, vice president, and E. B. Hunnicutt, secretary-treasurer. Hoffman is vice president of Mooney aircraft.

Top distributors during 1958 were honored at the sales meeting, with citations going to Mike Mulcahey of Kansas City as No. 1 in sales, to Bob Dolan of Blackfield Aero Industries of Oakland, No. 2 in sales, and West Texas Flying Service, Midland, No. 3 in sales.

Foreign sales of Mooney airplanes were topped in 1958 by Sergio Navar-

Thirty-five new 4-place Mooney Mark 20A's were delivered at Mooney Aircraft's annual sales meeting for a mass flyaway. The firm delivered 168 aircraft during 1958 for a new record.

rete of Santiago. A sportsman, Sergio is national ski champion of Chile. He and his staff flew 6 new Mooney Mark 20A's home to Chile from the meeting, from which a total of 35 new Mark 20A's were flown to all corners of North America in a mass flyaway.

"We've come a long way because our airplane has gained widespread acceptance with its unmatched efficiency," Hoffman commented during the meeting. "From 93 airplanes delivered in 1957, we climbed to a position of delivering 133 airplanes prior to our 1958 annual sales meeting, at which 35 more were delivered for a 1958 total of 168 planes. That's outstanding sales performance because it occurred during a year in which the recession severely handicapped many other businesses. We aren't the biggest in the airplane business but we have plenty of reasons to believe we are the best and our sales improvement shows we're going places in a hurry. Our earnings are up as well as our sales — we netted $145,000 in 1958 as compared to $93,000 in 1957. Our sales will be greatly stimulated by the two new models we have in the works — the 250-hp. Mark 21 next summer and the twin-engine Mark 22 next year. The outlook for Mooney Aircraft was never brighter than it is right now."

Mooney distributors and dealers in the U. S. are as follows:

ARIZONA: Powers Aviation, Phoenix.
CALIFORNIA: Aero Activities, Sacramento; Sierra Sky Park, Merced; Blackfield Aero Industries, Oakland; Corporate Aircraft Associates, Long Beach; Lou Kidd, Stockton.
DISTRICT OF COLUMBIA: Cecil Elrod, Washington.
IDAHO: Robert N. Price, Downey.

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Part of the activities at Mooney's sales meeting is pictured below. At right, Mike Mulcahey of Kansas City (left) receives top distributor award for 1958 sales from Norman Hoffman, president of Mooney Sales Company.

Designed for aerial application of crop chemicals, this is Piper's new PA-25 Pawnee now going into limited production. For dust or spray, it features high-visibility cockpit with crash protection, 1,100-lb. useful load at a 2,300-lb. gross and is powered by a 150-hp. Lycoming engine.

—(Piper Photo.)

Piper Pawnee For Dust Or Spray

A LOT of people in aviation have talked about the need for specialized crop plane design and manufacture and now Piper Aircraft Corporation has become the first personal aircraft manufacturer to do something about it. Piper is starting production early in 1959 on a new low-wing PA-25 Pawnee designed for the sole purpose of applying agricultural chemicals for crop improvement and insect control.

New in design, the Pawnee nevertheless goes into production with many components from other Piper production models. Wings, flaps and ailerons are derived directly from the Super Cub but are beefed up for heavier loads. The power plant package is the same as in the Piper Tri-Pacer, including the same 150-hp. Lycoming engine, cowling, and engine mount components. The landing gear is similar to that of the Piper Pacer, using an internal Hydrasorb shock absorbing system. Tri-Pacer axles, Comanche wheels and brakes and Apache tires are used. The single seat is an Apache seat for comfort and rudder pedals are from the Apache.

But everything else is new, including the fuselage, which is deeper, wider and longer than that of the Super Cub.

The Pawnee is the first airplane to come out of Piper's new Development and Research Center at Vero Beach, Florida. More will come from that outstanding laboratory, directed by Fred E. Weick, noted aeronautical engineer who gained fame years ago with his pioneering Ercoupe and more recently as director of the experimental agricultural aircraft design project at Texas A. & M. College, which enjoyed industry-wide support in the development of the famous Ag-1 design.

With a 2,300-lb. gross weight, the 150-hp. Pawnee has a useful load of 1,100 lbs. and its hopper has capacity for either 110 gals. of chemical liquid for spray or 20 cu. ft. of dust. This hopper is of polyester plastic reinforced with fiberglass for maximum freedom from corrosion. It has a short fore-and-aft dimension and steeply-sloped walls so dust, when it is carried, will slide out easily. It has a large sealed door, which hinges forward and lies flat on the fuselage top, out of the way, the opening entirely clear of the wings and easy to load mechanically or by hand.

The Pawnee's hopper is located on approximately the center of gravity so that variations from full to empty load cause no change in trim. It is also sufficiently large to house a man, and a jury seat is provided so that a helper can be flown to and from location.

Fuselage width of 36 ins. provides for a very comfortable cockpit, which is protected by a steel-tube turnover structure and fiberglass and plastic top. This cockpit is mounted high atop the airplane so that maximum visibility is provided, especially downward to the front. Most agricultural flying accidents involve collision with objects on the ground or wires and optimum visibility is demanded. Its combination windows and doors are hinged at the bottom so that the airplane may be flown with them open and hanging down — they ride about two inches out from the sides. Or, they can be quickly removed. A cabin heater is provided.

Crash Injury Research recommendations have been followed to a large extent in making the Pawnee's cockpit safer than any cockpit available. Its safety features are discussed fully on the opposite page, comments by Fred Weick.

Side fuselage cowling panels are removable back through the front part of the cockpit and the bottom panels are removable all the way back to the tail. This gives easy access to the fuel tank, landing gear shock absorbers, hopper area, rudder pedals and controls. The battery is located just inside the right door and is readily accessible for servicing.

Maintenance is a major factor in successful agricultural operations and

(Continued on page 30)

Hopper of 20-cu. ft. capacity is in front of cockpit on Pawnee, will carry dry or liquid chemicals. Fuselage panels are removable for easy access and cleaning. Pawnee's many safety features adhere to Crash Injury Research and agricultural aviation experimentation over many years of study.

—(Piper Photo.)

Safety And Crash Survival Aspects Of Pawnee Design

By FRED E. WEICK
Director
Piper Aircraft Development Center
Vero Beach, Florida

BECAUSE crop-dusting is an unusually hazardous form of flying, and accidents to both airplanes and pilots have a critical influence on the cost of operation, a determined effort has been made in the design of the Piper PA-25: (1) to decrease the likelihood of accidents through ample field of view and satisfactory lateral control at the lowest speeds; (2) to aid the airplane to get through or past wires with a minimum retarding or deflecting effect; and (3) to protect the pilot as far as possible in a crash.

Under Item 1, in view of the fact that approximately half of the fatal crop-dusting accidents are the result of collisions with wires, trees, etc., the field of view forward and down is obviously of extreme importance. In the PA-25 an unusually good view forward and down has been obtained by placing the pilot high in the fuselage. In addition, the low-wing arrangement enables the pilot to see where he is going in turns close to the ground, and an excellent view to the rear has been provided for the pilot who wants to look back at the swath he is laying.

Under Item 2, a sharp leading edge has been provided for the landing-gear struts to help the airplane break through wires or tree branches. In addition, a cable is strung from the top of the cockpit to the top of the rudder to prevent the vertical tail from being snagged.

In the design of this airplane a great deal of effort has been made to protect a pilot in a crash (Item 3). Fortunately nearly all crop-dusting crashes occur at relatively low speeds and the findings of the Crash Injury Research unit of Cornell Medical College, supplemented by information obtained by the military air services, have shown that low speed crashes need not be fatal. The main features of the PA-25 in this respect follow the lead of the Ag-1 and (1) place the pilot behind all heavy objects or loads in the airplane; (2) support the pilot with a sufficiently strong harness in such a manner that his head will not contact any heavy or sharp object and in a cockpit that will not collapse in such a way that members will injure him; and (3) provide as much wing and fuselage structure ahead of the pilot as feasible so as to absorb the shock of a crash and reduce the deceleration of the pilot's compartment as much as possible.

The Aviation Crash Injury Research unit has made the following recommendations for crash survival design:

1. Designing forward fuselage and cabin structures to resist nominal crash loads — as well as flight and landing loads.

2. Designing aircraft structures to absorb energy by progressive collapse.

3. Designing tubular structure to bend and fail outwardly — away from the occupants.

4. Locating the passengers' and pilots' seats as far aft in the fuselage as possible — behind the wing.

5. Locating fuel tanks in, or on, the wings — *not* between the firewall and instrument panel.

6. Providing space between the instrument panel and firewall (or nose section) to permit forward displacement of the panel and instrument cases.

7. Designing the instrument panel to be free of sharp, rigid edges in range of the pilot's head.

8. Fabricating the instrument panel of ductile material and/or using an energy absorbing shield on the panel face.

9. Mounting instrument cases on shear-pins and/or as low as possible on the panel.

10. Providing shoulder harness, safety belts, seats and seat anchorages of sufficient strength to resist failure up to the point of cabin collapse.

The PA-25 design conforms to all of these recommendations except No. 5, which objects to locating the fuel tank in the fuselage between the firewall and the instrument panel, and prefers a location in or on the wings. For this particular airplane, our preference was for the fuselage location, because it permitted the use of a single short fuel line with simple gravity feed. Wing tanks with the low-wing arrangement would have required a fuel pump and a more complicated plumbing system including a selector valve. Accident statistics show that many accidents and a fair number of fatal ones are caused by failure of complicated plumbing systems and misuse of valves. We considered that in the case of the PA-25 the general safety would be enhanced more by the

NEW LOW-COST VERSION OF POPULAR PIPER TRI-PACER is this new 4-place "Caribbean," priced at $8,395 with with 150-hp. Lycoming engine, 900-lb. useful load at gross weight of 2,000 lbs. and empty weight of 1,100 lbs., 36-gal. fuel capacity and 132-mph. cruise speed on 75% power at 7,000 ft. Deluxe version, including Narco Superhomer and navigation lights, is $9,350.

use of a fuselage tank with simple plumbing than by the use of wing tanks with a fuel pump, selector valve and more complicated plumbing. We recognize that the fuselage tank may be more likely to cause a fire following a crash, but feel that the rearward position of the pilot (behind the hopper) and his ease of exit, coupled with his likelihood of remaining conscious and relatively uninjured in a crash, make it probable that he will be able to escape in case of fire.

We have gone a step further than Recommendations 7 and 8 in regard to the instrument panel, and have provided a rounded sheet metal cushion above the instruments that projects rearward far enough to prevent the pilot's head from striking the instruments. This type of sheet metal form has been found to absorb energy effectively when struck by a human head, with a minimum damage to the head structure. Of course, if an effective shoulder harness is always worn, the pilot's head would contact the metal buffer only in the case of an extremely severe crash, but the buffer is easy to provide and gives an extra measure of safety.

Under Recommendation 10, an extra strong seat-belt and shoulder harness are used, and are anchored directly to structural truss points in the fuselage. Provision has been made for the installation of an inertia reel supporting the shoulder harness and giving the pilot more freedom of action (optional equipment).

As in the case of the Ag-1, the shoulder harness straps are linked permanently to their respective sides of the seat belt. This makes it unnecessary for the pilot to hunt up and put together four loose ends and makes the harness easy to slip into and fasten with a single buckle.

Under Recommendation 3, the top longerons in the cockpit bay are given a slight outward bulge so that they will be sure to fail outwardly in case of a severe head-on crash. The fuselage is designed so as to fail progressively from the front, however, thus reducing the deceleration of the pilot's cockpit, and in ordinary low-speed crashes it is thought that the pilot's compartment should remain substantially undamaged.

A. Howard Hasbrook of Flight Injury Research visited us during the early design period and made the following additional suggestions which have been adopted: (a) a cushioning head-rest be provided to cushion the back of the head and the cervial spine against "whip lash" rear loads; (b) cockpit flooring be made of metal to protect the feet and lower legs; (c) the projections be removed from the rudder pedals to protect the ankles; (d) the shoulder harness follow a horizontal plane, from the pilot's shoulders back to the point (in the fuselage) to which the upper torso load is initially transmitted, and (e) the longitudinal axis of the inertia reel be set 15 degrees below the longitudinal axis of the aircraft, in order that the reel will definitely lock under imposition of nominal "vertical" crash loads.

It is considered that the 10-inch space between the metal floor and the bottom of the fuselage is an additional safety measure in relatively flat crashes.

Pilot comfort is very important to safe operation over long stretches. The pilot's seat in the PA-25 is the well upholstered and comfortable seat used in the Apache, but covered with a more durable and less luxurious material. The cockpit is roomy and great attention has been given to the correct location of the controls for easy and unmistakable operation. Rudder pedals with toe brakes are used, the same as on the Apache. Cabin heater and cabin ventilating systems are installed.

PIPER PAWNEE

(Continued from page 28)

the Pawnee was designed for maximum accessibility and easy maintenance. Piper says most operators prefer its type of fabric-covered, steel-tube fuselage construction. Where feasible, structural materials have been used which will withstand corrosive chemicals, such as plastic and fiberglass for the hopper and stainless steel for parts such as the tail brace wires and fittings and control cables. All steel parts are protected by corrosion-proof finish selected after years of testing, both at Texas A. & M. College and at Piper's Development Center. The inside of all steel tubing is treated with Lionoil. Even the ignition switch is corrosion resistant.

A hinged motor mount provides easy access to the rear of the 4-cylinder Lycoming and all control, fuel and instrument lines pass near the hinge axis so the engine can be swung without disconnecting them. A new Fram pleated paper air filter is used for protection in dusty operations — this filter has a standard dust removal efficiency of 99.5% as compared to about 85% for currently-used filters when they are in good condition. A Fram full-flow oil filter is available.

Dispersal equipment on the Pawnee features latest developments for maximum coverage with uniform patterns. Simplicity is stressed for easier maintenance and switching from dry to liquid chemicals. For example, the bottom of the hopper has a gate which will seal whether wet or dry. The standard spray system uses the same 1-inch Simplex centrifugal pump as on the PA-18A but has improved seals. The nozzles are on a boom located to the rear of and slightly above the wing trailing edge but which dips under the walkways and the fuselage. Thus the pilot can watch their operation and the boom is protected from striking objects such as trees and brush. A venturi distributor has been developed for dry chemicals which will handle the general run of dusting, seeding and fertilizing jobs.

A few deliveries of the Pawnee are anticipated in the Spring, but production will be limited to a service evaluation quantity until full tooling is completed later in the year. First units will be allocated to a wide variety of operating areas to permit careful field evaluation under all operating conditions.

Research made a molehill out of a mountain

Collins airline quality nav/comm systems • TSO'd for all present and future IFR needs
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Airline standards of quality in nav/comm system performance, reliability and safety are now available to *all* aircraft owners. Collins new panel-mounted equipments are less than nine inches long — short enough to panel mount in any single engine or larger aircraft. Receiver, transmitter, omni converter and power supply use the same components and undergo the same reliability and environment testing as the highest quality airline equipment.

51X-3 VHF RECEIVER — 190 consecutive crystal controlled channels from 108-126.9 mc. • front panel squelch and audio controls • provides VOR and localizer service when used with the 344D-1 • contains necessary control circuits and switching for glideslope channel selection • front panel edge lighting • weight 3.25 pounds.

17L-8A VHF TRANSMITTER — 90 consecutive crystal controlled channels from 118-126.9 mc • 3 watts power output • front panel edge lighting • weight 2.5 pounds.

344D-1 OMNI CONVERTER INDICATOR — Left-Right VOR and localizer indicator • To-From indicator • VOR course selector • Reciprocal bearing reading • completely transistorized • self powered from either 13.5 or 27.5 volt line • weight 2.4 pounds.

427B-1 and 427B-2 POWER SUPPLY — Supplies power for 51X-3 and 17L-8A • contains IF amplifier, audio amplifier and modulator for receiver and transmitter • provides extra audio inputs useable for interphone • 4.5 watts of speaker audio output • transistorized power section is maintenance free, operates quietly, causes no noise in receiver • 427B-1 operates on 27.5 volts and 427B-2 operates on 13.5 volts • weight 5.0 pounds.

BASIC SYSTEM — The 51X-3 / 17L-8A / 344D-1/427B system package provides professional IFR services at a cost of $2370. Total weight is only 13.15 pounds. You can install the 51X-3, 17L-8A, and 427B comm System immediately for only $1395. The 344D-1 can be added to your aircraft soon after. A marker receiver, the 51Z-2, is available at $640.

See your nearest Collins distributor for complete information.

COLLINS

COLLINS RADIO COMPANY
CEDAR RAPIDS • DALLAS • BURBANK

Ask an airline pilot about Collins

COMM SYSTEM w/power supply
$1395
NAV/COMM SYSTEM w/power supply
$2370

Here's Beech Aircraft's new 410-mph. MS 760 demonstrator, posed with crated equipment, parts and supplies which each purchaser receives with the airplane at its $210,000 price. In the crates are items so voluminous it takes 20 pages to manifest them. Included are wing hoist sling, aft fuselage hoist sling; two cradle fixtures, wing holsters; aft fuselage handling dolly; aileron, elevator, rudder, flap and speed brake rigging fixtures; engine handling hoist, engine handling adapter and towbar. Beech backs up each delivery with elaborate service.

(Beech Photo.)

Beech Launches Jet Sales

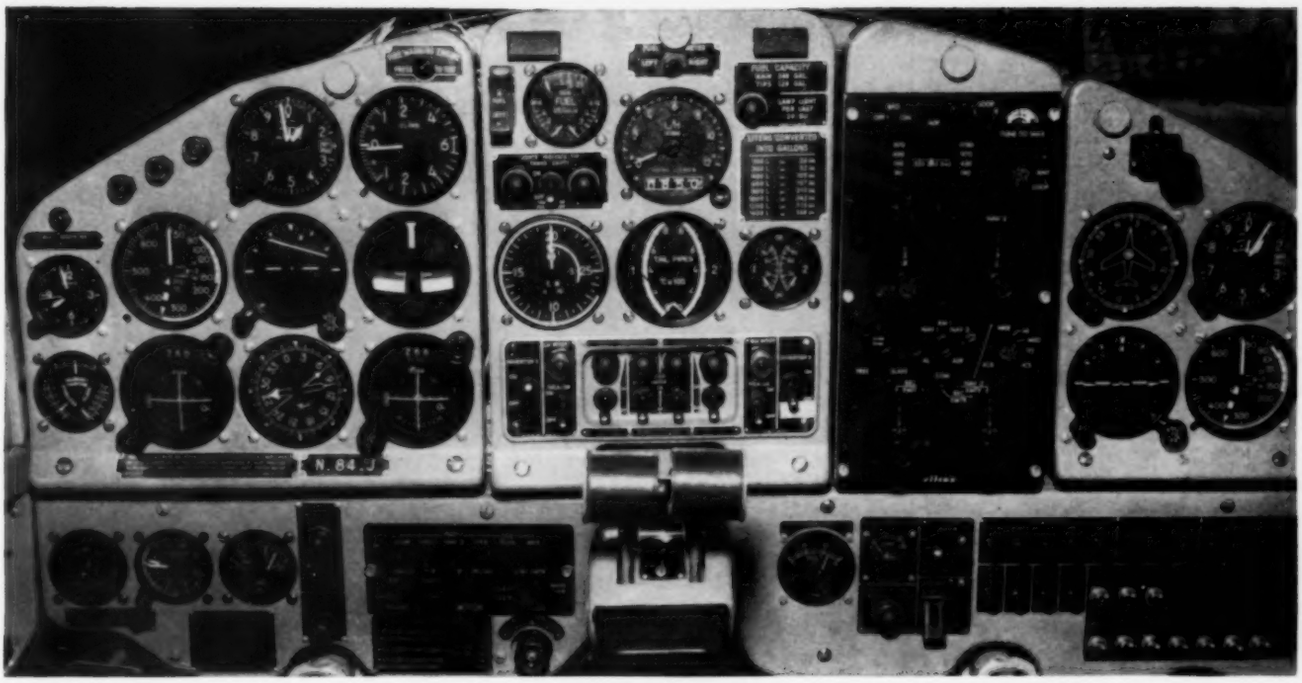
INTENSIFIED sales demonstrations of the first twin-jet business airplane on the market have begun with the new year as Beech Aircraft Corporation completed equipping its first French-built Morane-Saulnier 760. Personable Tom Gillespie is in charge as sales engineer and he expects to maintain a busy schedule of demonstrations through Beech distributors all over the country.

Priced at $210,000, the impressive little 4-place speedster with pressurized cabin is powered by two French-manufactured Turbomeca Marbore IIC jet engines, each rated at 880 lbs. thrust at 22,600 rpm. for maximum continuous operation. It has a top speed of 410 mph. and a cruising speed of more than 350 mph.

Beech has already delivered its first MS 760 and it is being operated by Timken Roller Bearing Co., which received the first MS 760 in this country. The second is the Beech factory's demonstrator. The third was to be delivered soon to an unnamed purchaser.

Every purchaser of the jet business plane receives complete and elaborate training, maintenance, parts and follow-up service support of the Beech factory. Because it introduces a new era in business flying, the factory's policy is to back each delivery to the hilt in service not merely as a sales project in assuring the customer of satisfaction but also to acquire as much factory experience as possible in establishing a jet service foundation for future developments. Thus the customer and the factory are getting the most for their money out of the revolutionary new jet and its operation.

Being the first twin-jet business plane, the MS 760 has considerable "growth" potential. Most obvious need for future improvement is its fuel and range capabilities. Under ideal cruise conditions, it will consume about 121 gals. of jet fuel per hour at 23,000 ft. while cruising at 21,000 rpm. for about 326 mph. Total fuel capacity is 375 gals., including two 62-gal. tip tanks. This condition gives it a range of about 940 miles for VFR flight with about 2 hrs. 45 mins. endurance. IFR operations would chop this range down to nearly impractical limitations. If less than favorable altitudes must be used, fuel consumption increases rapidly. It is 176 gals. hourly at 10,000 ft. and 21,000 rpm. for 333 mph., for example, and is over 200 gals. hourly at 10,000 ft. using 21,750 rpm. for a higher cruising speed of about 350 mph. Emphasis is clearly on accurate flight planning and fuel management.



Beech MS 760 panel has four sections with flight groups at each side, engine group, fuel management and starter switches at center above simple throttle console and custom Wilcox Canari console to right of center. Switch panel across bottom includes special auxiliary Wilcox switching unit to left of throttles. Large instruments in engine group are fuel flow (top), turbine rpm. indicator (left) and tail pipe temperature indicators (center).

—(Wilcox Photo.)

But more efficient fuel consumption can be expected from engine improvements already under development and the fast little pioneering jet can be expected to achieve more practical range capabilities during the next couple of years. Jet travel for business men in small twins will then come into its own.

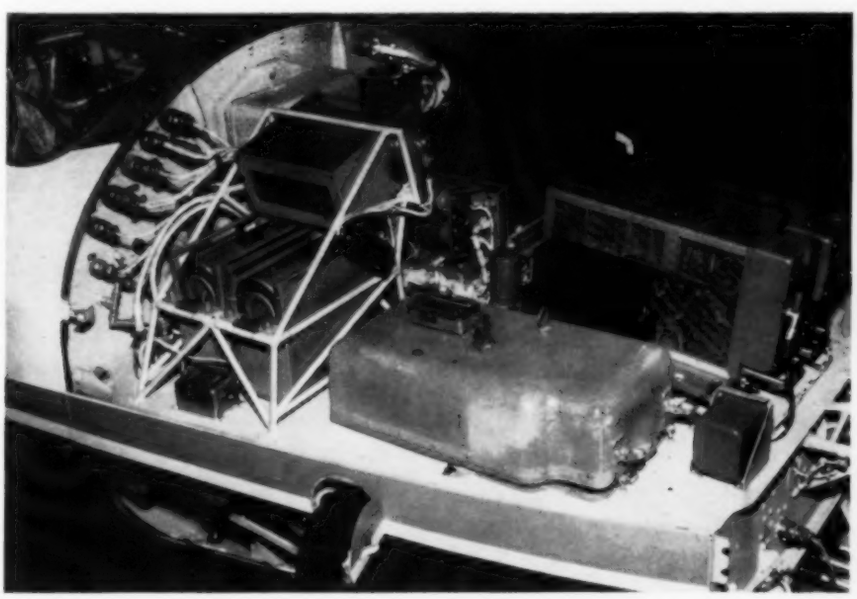
As it is, however, the MS 760 is an excellent start. At 7,500-lb. gross weight, useful load is almost 3,300 lbs. for the Beech demonstrator, its 4,280-lb. empty weight including impressive equipment. Its engines are currently authorized for 300-hr. overhaul periods by CAA and this is expected to go to 400 hrs. soon. The 300-hr. overhaul means 100,000 miles between overhauls, so that the 400-hr. authorization will be the equivalent in mileage to over 600 hrs. for a piston-powered 200-mph. airplane.

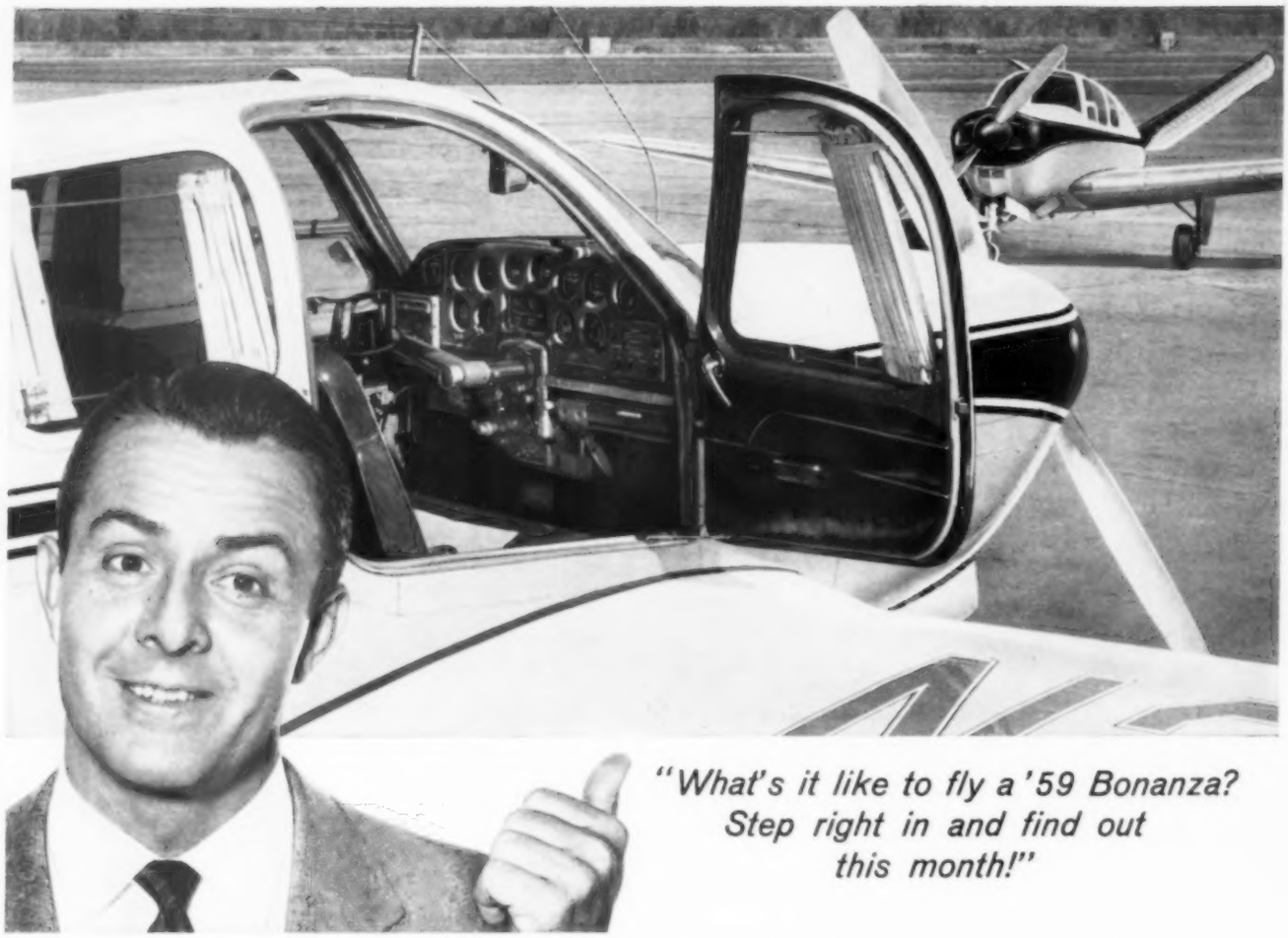
The Beech demonstrator is equipped with a complete Wilcox Canari package for radio communications and navigation. Wilcox Electric Co. of Kansas City said its installation, first in a private jet in this country, was tailored to the MS 760's special needs in space and weight requirements and gives the MS 760 a full complement of CAA-approved airline-standard equipment. In the package are two 706 omni receivers, three 715 dynamotor power supplies, a 701 ADF, 700 glideslope, 702 marker beacon, 709 audio mixing amplifier, 717C instrument switching unit and 740 gyro-stablized compass system. The switching unit allows the pilot to program

(Continued on page 52)

Wilcox ADF loop is flush-mounted in recessed cavity atop fuselage behind cabin (below). Nose radio installation includes special rack for three Wilcox dynamotor power supplies, two navigation receivers, switching unit, VHF transmitter and three dynamotors. In baggage compartment are ADF receiver, audio mixing amplifier, glideslope receiver, marker beacon receiver and compass amplifier. Two 130-volt, 400-cycle inverters are in compartment beneath nose radio gear.

—(Wilcox Photos.)





"What's it like to fly a '59 Bonanza? Step right in and find out this month!"

Discover why this 210 mph Bonanza is America's No. 1 single-engine business plane

That left-hand seat is reserved for you! If you haven't yet flown the new 1959 Bonanza, this is your invitation to do so. Your Beechcraft distributor or dealer is waiting to hand you the key, and to tell you about a number of excellent reasons for owning a new Bonanza. Reasons like these:

1. 19 to 65 mph faster than other single-engine 4-place business planes. Over 200 mph cruise at 75% power.

2. 250 hp fuel injection engine for easier starting, smoother operation, freedom from carburetor ice.

3. You can own and fly a Bonanza for as little as 8¢ a mile, including depreciation and maintenance.

4. The Bonanza's rugged construction enables it to be licensed in a category requiring 15½% more strength than any other single-engine business airplane.

5. Super-soundproofed cabin that lets you talk in normal tones. (Notice this on your demonstration flight.)

6. Longer range—up to 1,245 miles non-stop.

7. High rate of climb—1,170 feet per minute.

8. High service ceiling—20,000 feet.

9. Clear 50 ft. obstacle in 940 feet, no wind. Lands in 1,130 feet over 50-ft. obstacle, no wind.

10. High payload—805 pounds with full tanks.

So arrange for your demonstration flight soon. Discover how easy it is to "graduate" to Bonanza ownership. Ask your Beechcraft distributor or dealer about low-cost Beech financing and leasing plans. Or write Public Relations Dept., Beech Aircraft Corp., Wichita 1, Kansas, U. S. A.

SUPER 18 TWIN-BONANZA BONANZA TRAVEL AIR MS-760

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

"I had no idea this Travel Air had so much get-up-and-go!"

Executive Pilots:

See what you're missing! Fly the world's quietest 200 mph business twin now

Many executive pilots who have heard the enthusiastic reports about the new Beechcraft Travel Air are asking, "Can *any* light twin be *that* terrific?"

If you are one of these pilots, there's only one way for you to find out. And that's to fly the Travel Air yourself. Your Beechcraft distributor or dealer cordially invites you to do it this month.

Just to give you some idea what to expect, here are a few facts about the Travel Air and what it will do:

1. Cruises over 200 mph with only 75% power.
2. World's quietest executive airplane. You hear less noise in the Travel Air's super-soundproofed cabin in flight than you do in a car at 60 with the windows open.
3. Real "get-up-and-go" performance—the Travel Air clears ground in only 850 feet.
4. Longer range—up to 1,410 miles non-stop.
5. Climbs at 1,360 feet per minute—fully loaded.
6. Lands shorter. Stops 590 feet from touchdown.
7. A real 'miser' on gas—up to 11 miles per gallon.
8. Responds like a light plane, yet feels and flies like a big twin. Whether you're a single-engine pilot ready to move up or a veteran of the big twins, you'll quickly feel at home in the Travel Air.

So why wait? Take a demonstration flight this month. Ask your Beechcraft distributor or dealer about low-cost financing and leasing plans, or write Public Relations Dept., Beech Aircraft Corp., Wichita 1, Kansas, U. S. A.

SUPER 18 TWIN-BONANZA BONANZA TRAVEL AIR MS-760

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

. . . for certified Beechcraft service

To obtain the best service for your Beechcraft and for prompt attention to maintenance and overhaul requirements, visit the Certified Beechcraft Service Stations listed.

AIRCRAFTSMEN, INC.
Will Rogers Field
Oklahoma City, Oklahoma

ALAMO AVIATION, INC.
Municipal Airport
San Antonio, Texas

ATLANTIC AVIATION CORP.
- Teterboro Airport
  Teterboro, New Jersey
- Logan International Airport
  East Boston, Massachusetts
- International Airport
  Philadelphia, Pennsylvania
- New Castle County Airport
  Wilmington, Delaware

BUTLER CO., AVIATION DIVISION
Midway Airport, Chicago, Ill.

CURREY SANDERS AIRCRAFT CO., INC.
Downtown Municipal Airport, Shreveport, La.

CUTTER-CARR FLYING SERVICE, INC.
West Mesa Airport, Albuquerque, New Mexico

GRAY AIRCRAFT SVC. CO., INC.
D. A. Cody, Service Manager
Love Field, Dallas, Texas

GREENSBORO-HIGH POINT AIR SERVICE, INC.
Greensboro-High Point Airport
Greensboro, North Carolina

ELLIOTT FLYING SERVICE
- Municipal Airport, Des Moines, Iowa
- Municipal Airport, Davenport, Iowa

THE NORMAN LARSON CO.

PLANESERVICE, INC. (Service Division)
Van Nuys Airport, Van Nuys, Calif.
(Los Angeles Area)

J. D. REED CO., INC.
Municipal Airport, Houston, Texas

ROSCOE TURNER AERONAUTICAL CORP.
Municipal Airport, Indianapolis, Ind.

TEXAS AVIATION CORPORATION
G. K. Roberts, Pounds Field
Tyler, Texas

TOPEKA AIRCRAFT SALES & SERVICE
Municipal Airport, Topeka, Kansas

TRADEWIND AIRPORT CORP.
Tradewind Airport, Amarillo, Texas

TULSAIR DISTRIBUTORS, INC.
Hangar 8, Municipal Airport, Tulsa, Oklahoma

UNITED AIRPLANE SALES, INC.
New Municipal Airport
Wichita, Kansas

Put Your BEECHCRAFT in BEECHCRAFT Hands

Here's Fred Ayer's demonstrator version of one of the 30 Convair 240's he acquired and is marketing to corporate aircraft users in standard 40-passenger airline or 19-place executive configuration. All are air conditioned, pressurized, radio-equipped and ready to go. AiResearch Aviation Service performs interior and other modifications including 50% fuel capacity increase.

Corporate Ayer-Liner Convair 240

MARKETING of pressurized and air-conditioned executive Ayer-Liner conversions of Convair 240 airliners acquired from American Airlines has been launched on a nationwide demonstration tour of leading corporate-flying bases by Frederick B. Ayer & Associates of New York. Standard airline versions, ready to go, are priced at $250,000, with executive versions, modified by AiResearch Aviation Service with plush interiors and other features including 50% more range with 1,500-gal. fuel capacity and 42,400-lb. gross weight for take-off (standard is 41,200 lbs.), priced at $385,000. Lease arrangements are available. All are radio equipped.

None of the Convairs has more than 500 hours since engine and propeller overhaul or since major progressive overhaul on the airframe. The executive interior version seats 19, the airline version 40. All have pressurized cabins, P & W R-2800-83AMA (AA Modification) engines, reversing, full-feathering HS 43E60 propellers (689-5A12), hot-wing anti-icing, carburetor alcohol de-icing, Nesa electrically anti-iced windshields and electrically-heated props.

Ayer has 30 of the Convairs. He has also bought two DC-6B four-engine airliners from Continental Air Lines and is offering a 66-passenger version at $775,000 and a 102-passenger version at $875,000.

With Ayer in the Convair marketing is a corporate-flying sales staff including Tony Ming, assistant to the president and formerly long associated with Spartan Aircraft; Jim Welsch, 35 years in aircraft sales, more recently closely identified with Grumman Widgeon conversions and now Ayer's vice president in charge of sales; Mauricio de Castro, Latin American sales manager; Bert Gordon, chief pilot and sales representative; Tom Sedlar, public relations director formerly with American Airlines as promotional representative; Hull Wickham, former head of Mattituck Air Base Corporation and now Ayer's vice president of engineering and maintenance; and other well-known figures. Ayer's headquarters address is 250 Park Avenue, New York City.

Here are some of the details from a description of the standard Convair CV-240-R-2800 CA-15 Type transport as prepared by American Airlines for the airplanes acquired by Ayer:

Engine Ratings: Take-off with water injection — 2,400 bhp. at 2,800 rpm., 56.5 ins., 800-ft. critical altitude. Take-off — 2,100 bhp. at 2,800 rpm., 54 ins., 2,300-ft. critical altitude. Meto — 1,900 bhp. at 2,600 rpm., 46.5 ins., 4,900-ft. critical altitude. High blower meto — 1,600 bhp. at 2,600 rpm., 45 ins., 16,200-ft. critical altitude.

Weights: 41,200-lb. maximum take-off; 38,900-lb. zero fuel weight; 39,-800-lb. maximum landing; 28,929-lb. empty weight.

Performance: Take-off — 4,370 ft. at sea level, standard air, 2,400 bhp. wet, 12-deg. flaps, 41,200 lbs. Take-off — 4,480 ft. at sea level, standard air, 2,100 bhp. dry, 16-deg. flaps, 39,050 lbs. Landing — 2,350 ft. wet, from 50 ft., sea level, standard air, 39,800 lbs., 39-deg. flaps. Landing — 3,920, CAR, wet. Landing — 2,280

(Continued on page 52)

Plush interior of 19-place Ayer-Liner executive version, converted from the airline configuration by AiResearch Aviation Service. Standard version sells for $250,000, executive configuration for $385,000.

Corporate owners of 4-place Bell 47J copters operate them from lawns and parking lots right at the door of their plants (above). Key construction men in copters cover many site locations in a short time, unhampered by surface handicaps.
—(Bell Helicopter Photos.)

Helicopters Serve Business and Industry

HELICOPTER salesmen are penetrating farther and farther into business and industrial activities by placing modern and efficient copters at work performing a wide range of jobs more effectively than by any other means.

This trend has a double meaning for the helicopter business. First, new users of copters are growing as an important market segment. Secondly, copter manufacturers are becoming less dependent on a few highly-specialized customers as more and more diversified users are cultivated. Until recent years, most copter work was performed in the world's remote or wilderness areas, or places more or less inaccessible by other means. Such activity continues and on a large scale. But to it are being added equally large-scale copter activities in big-city industrial areas.

Sales efforts to uncover new users began paying off last year. Bell Helicopter Corporation's commercial sales manager, Fred Roscoe, reports that 60% of his domestic commercial sales in 1958 went to new customers. "Had we drifted along with only the business available from old customers, our sales would have fallen off more than half," Roscoe commented. "But the sustained push for new customers brought significant results — we doubled the amount of new business, with new customers the previous year accounting for only 30% of our 1957 volume."

Where are the new customers for helicopters found, and what businesses do they represent? Bell's 1958 sales record provides some interesting answers to those questions.

"New Bell helicopters were put to work for the first time by a coal company in Pennsylvania, a lumber company in Oregon, a machinery distributor in Connecticut, for example," Roscoe said. "Construction companies in Indiana and Ontario, Canada, began using our machines. A bakery in West Virginia was sold a Bell. A contractor

This 4-place Bell works in the oil fields, is pictured aboard an offshore drilling platform in the Gulf of Mexico where travel by small boat is rough, slow and hazardous.
—(Bell Helicopter Photo.)

Everybody understands why the Armed Services use helicopters . . why the off-shore oil operators do . . why the map makers do. But why should *your* competitor use a Bell? Is it (1) because planes bore him? (2) To cause talk at the Club? (3) To make *his* competitors envious? (4) To beat the five-o'clock scramble?

Oddly enough, these are four excellent reasons why he *does*. Point by point, here's a typical Bell user's story: (1) Airplanes, large and small, are fine for long hauls; it's the short jumps they can't handle . . the boresome trips to the airport, to the nearby customer, the nearby plant. Only the helicopter can save these hours . . change them back into productive time. (2) The company with the Bell *does* get talked about . . when the helicopter ferries in a VIP, helps the mayor cut a ribbon, and particularly when it saves a life. (3) Competitors are envious indeed, when word spreads that the Bell operator has licked a major overhead cost. (One utility saves $200.00 on every line transmission patrol by using the Bell for fly-and-hover inspection.) (4) The five o'clock scramble — and the eight o'clock — are wasteful and enervating to the top executive. Logically, many companies owning Bells provide their top boss with a serene, quick, all-weather trip by helicopter.

In short, businessmen use the Bell for hundreds of jobs . . all impossible by any other transportation.

Perhaps we still haven't touched on your type of operation . . but we'd like to send you Bell-user case histories that will. If you'll drop us a note on your letterhead, we'll open our files, and send you, also, information on Bell's own LEASE/PURCHASE PLAN and on independent CHARTER HELICOPTER SERVICE. Write Dept. 12A, Bell Helicopter Corporation, Fort Worth, Texas.

Remember, the Bell has been proven by the U. S. Armed Forces and Industry in 2,500,000 hours of dependable flight; is today operating in 52 countries, in every extreme of climate and terrain.

Why do you think your competitor uses a helicopter?

BELL Helicopter CORPORATION

FORT WORTH, TEXAS
SUBSIDIARY OF
BELL AIRCRAFT
CORPORATION

Watch "WHIRLYBIRDS" on TV . . consult your local paper for time and station.

A complete hut (left) and a bundle of construction materials (right) are among cargo airlifted by Scancopters in Northern Norway, using Bell helicopters.

in British Columbia became a first-time customer."

New customers also included several newly-organized air taxi operators. Helicopters air taxis are becoming active in more and more areas of the United States. They offer a variety of services, including charter work, contract flying by the week, month or year or a single trip. Their customers include department stores, whose executives travel by copter from one branch to another; real estate developers, who show prospects their holdings to point out location advantages from the air; chain gas station operators, whose managers and sales promoters can cover more stations per day by copter than by auto; construction firms, whose key men can perform inspections and other hurry-up jobs along miles of highway or pipeline construction without being slowed by lack of surface access or handicapped by traffic jams along improvised detours; local government officials, who find the copter advantageous in traffic studies, city planning and field inspections — the list is practically endless.

Local government units, incidentally, can obtain valuable assistance from the Office of Civil Defense in the purchase of helicopters for use in search and rescue and planning as well as actual use in emergencies such as disasters — 50% of the cost will be shared by the national government. The records are replete with hundreds of newspaper accounts describing how helicopters have saved lives and alleviated suffering in times of disaster — authorities are convinced the helicopter has no equal as a machine capable of mercy missions, search, rescue, medical and food supply and other essential operations in disaster areas. However miraculous such copter work has proved, communities still must be sold on this score because disaster relief is seldom planned in adance — tragedy usually strikes first before communities become impressed with the necessity for planning. Community ownership and operation of helicopters — on the same basis as fire department equip-

Lifting, towing and ferrying — this big Vertol 44 with amphibious gear moved seismograph equipment and crews, including their recording shacks, through many miles of Louisiana delta coastal swamp in search for oil. Indair, Inc., performed the job for Pan American Oil Co. The recording shack with its equipment weighs 3,200 lbs., was both lifted and towed by cable across the grassy mire.

Live TV news coverage from hovering helicopters, pioneered by KTLA-TV in Los Angeles in project with National Helicopter Service & Engineering Co. of Van Nuys and General Electric, may become nationwide with Telecopters operating in 120 metropolitan areas. Key is transistorized TV transmitter aboard copter, engineered to small dimensions and low weight. Equipment includes 100-watt generator. Note antenna. KTLA-TV's audience rating soared 50% after first week of Telecopter operations in which viewers enjoyed ringside seat at major news happenings. Telecopter transmissions are beamed to central pickup atop Mt. Wilson, simultaneously rebroadcast from main station. Photos show Bell 47G-2 Telecopter. Larger Bell 47J is planned, adding extra TV technician to crew.

(Bell Helicopter Photos.)

ment, for example — represents a growing market yet to be fully developed.

Several cities, counties and states already operate their own copters. New Bell helicopter sales last year went to the Indiana State Police, who operate 3 Bells, and the Department of Lands and Forests at Calgary, Alberta, Canada. Copters are operated by police, sheriff's officers and other local government agencies in Washington, D. C., Chicago, Detroit, New York, Los Angeles and Minneapolis-St. Paul.

Charter and commercial operators of helicopters are constantly helping the manufacturers of helicopters to spread the word through business and industry on the copter's advantages. In fact, charter and taxi operators are among the leading salesmen of copters — in carrying their customers or performing work for them, they automatically sell these users on rotary-wing benefits. These operators are located in many states, as shown by this listing of charter operators as compiled by Bell Helicopter Corp.

ALASKA: Alaska Helicopters, Spenard: Polar Helicopters, Spenard.

CALIFORNIA: Aetna Helicopters, Etna; A-F Helicopters, San Fernando; Briles Manufacturing, El Segundo; California Copters, La Canada; Cal Rotors, Pasadena; General Helicopters, Santa Barbara; Helicopter Corp. of America, Santa Monica; Hemisphere Helicopters, Santa Monica; Kern Copters, Bakersfield; LaMesa Helicopter, LaMesa; A. L. Newman, Kelseyville; Pacific Helicopter, Santa Monica; Redding Air Service, Redding; Rick Heli-

HERE'S THE SIGN OF THE FINEST SERVICE FOR YOUR PIPER AIRPLANE

Piper has established a world-wide network of Factory-Certified Service Centers to assure you of the finest service possible for your Piper airplane.
To earn the coveted designation, service organizations must meet rigid requirements, must be properly equipped and staffed by personnel who have attended the intensive service school conducted at the Piper plant.
Dozens of Piper Factory-Certified Service Centers have been established throughout the nation and around the world, and more are being designated to assure convenient and competent Piper service wherever you may wish to fly.

FOR THE BEST IN PIPER SERVICE AND MAINTENANCE VISIT THE PIPER FACTORY-CERTIFIED SERVICE CENTERS LISTED BELOW

ANDERSON AVIATION CO., INC.
Sky Harbor Airport
P. O. Box 5175
BRidge 5-5741
Phoenix, Arizona

AVIATION SPECIALTIES COMPANY
Gallup Municipal Airport
P. O. Box 1241
UNion 3-3621 *UNion* 3-5394
Gallup, New Mexico

BROWNING AERIAL SERVICE
Municipal Airport
P. O. Box 1173
HOmstead 5-1728
Austin, Texas

DES MOINES FLYING SERVICE, INC.
Municipal Airport
ATlantic 8-2218
Des Moines, Iowa

ELLIOTT FLYING SERVICE, INC.
Davenport Municipal Airport
P. O. Box 418
2-2689
Davenport, Iowa

EXECUTIVE AIRMOTIVE, INCORPORATED
Stewart Air Park
P. O. Box 70
GArfield 8-3581, *GArfield* 2-7277
Parkersburg, West Virginia

J & J AIRCRAFT, INC.
Sarasota-Bradenton Airport
821 *General Arnold Road*
ELgin 5-6868
Sarasota, Florida

KEN-MAR AIRPARK, INC.
Ken-Mar Airpark
Box 2667, *University Station*
MUrray 3-6589
Wichita, Kansas

LOUISIANA AIRCRAFT
Downtown Airport
P. O. Box 1428
WAlnut 1-9618
Baton Rouge, Louisiana

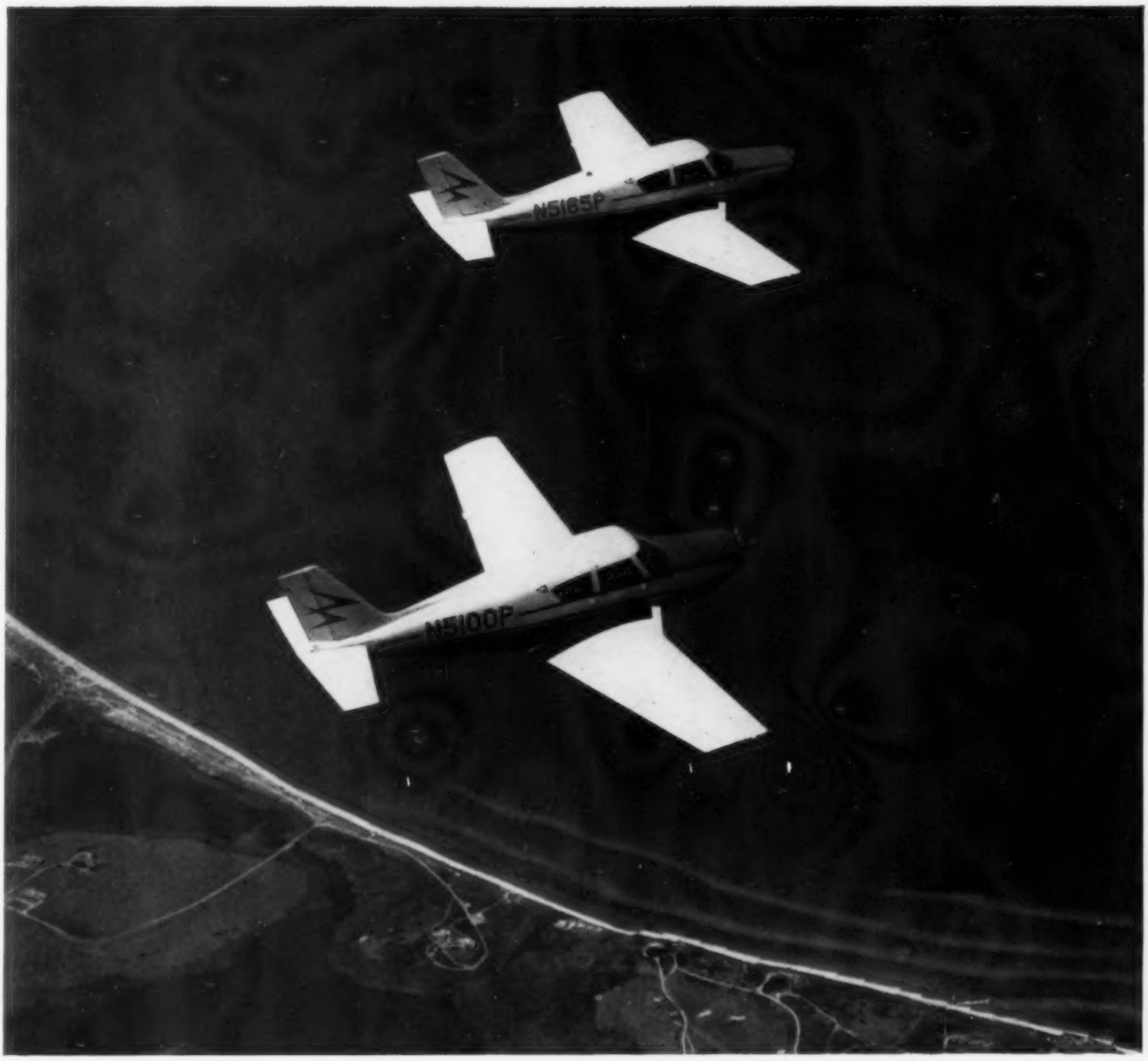
PIEDMONT AVIATION, INC.
Smith Reynolds Airport
PArk 5-0511
Winston-Salem, North Carolina

RED AIRCRAFT SERVICE, INC.
Broward County International Airport, Building 78
JAckson 3-9624
Fort Lauderdale, Florida

SOUTHERN FLIGHT SERVICE, INC.
Douglas Municipal Airport
P. O. Box 1211
EXchange 9-6374
Charlotte, N. C.

SPARTAN AIRCRAFT COMPANY
Aviation Service Division
Tulsa Municipal Airport
TEmple 5-4491
Tulsa, Oklahoma

ST. LOUIS FLYING SERVICE
Lambert Municipal Airport
Box 6067, *Lambert Field Station*
PErshing 1-0450 & *PErshing* 1-1770
St. Louis, Missouri



A pair of Aces: 250 hp Comanche, 181 mph cruise, $18,995; 180 hp Comanche, 161 mph cruise, $14,995

NO AIRPLANE WAS EVER SUCH A LOGICAL BUY!

JUST FLY THE COMANCHE *(you never flew anything nicer!)* . . . study its rugged *(really rugged)* all-metal construction . . . compare its advanced design features *(laminar-flow wing, single-piece stabilator, swept rudder)* . . . check its cabin *(roomier, much roomier)* . . . analyze its lower initial investment and lower operating costs. Look at the Comanche any way you wish, and it easily becomes your only sensible choice. Two separate models suit middle-price or high performance requirements—the economical 180 hp Comanche or the top performing 250 hp Comanche—both with superbly superior Lycoming power. For the ultimate, consider the AutoFlite Comanche with sensational new Piper AutoControl. See, FLY the Comanche at your Piper dealer's, or write for new 1959 Comanche brochure, Dept. F-1, Piper Aircraft Corporation, Lock Haven, Pennsylvania.

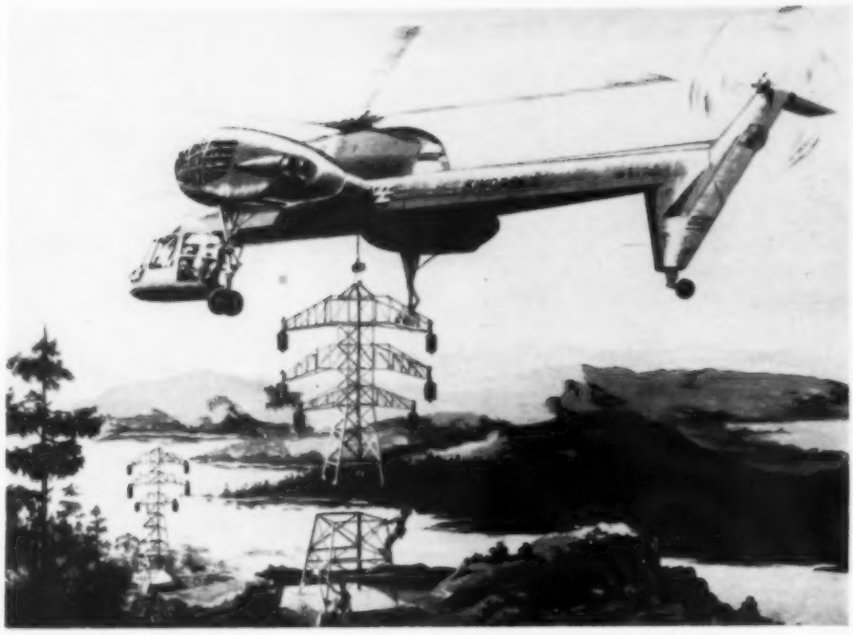
PIPER *Comanche*

copters, San Francisco; Rotor Aids, Ventura; John Simone, Anaheim; Southern Cal Helicopters, Long Beach; Southwest Helicopters, Van Nuys; Stewart Air Service, Hawthorne; Calicopters, Stockton and San Francisco; Western Helicopters, Anderson; World Wide Helicopters, San Fernando.

COLORADO: Helicopters, Inc., Denver. FLORIDA: Helicopter Leasing Corp., Jacksonville; Helicopters International, St. Petersburg; Sunline Helicopters, Miami; Coastal Copters, Jacksonville. IDAHO: Gem Helicopter, Boise; James E. Hall, Elk River; W. Lynn Roberts, Boise.

ILLINOIS: C. K. G. Associates, Elgin; Chicago Helicopter Airways, Chicago; Chicago Seaplane Base, Lombard; Currey Flying Service, Galesburg; Helicopter Air Lift, Chicago; Howell Flying Service, Blue Island; Lewis Aircraft, Lockport; Mid-States Aviation, Northbrook. IOWA: Energy Farm Equipment, Monticello. DISTRICT OF COLUMBIA: Pilgrim Helicopter, Washington. LOUISIANA: General Air Transport, Kenner; Helicopter School, Inc., New Orleans; Petroleum Helicopters, New Orleans and Lafayette. MARYLAND: Chesapeake & Potomac Airways, Baltimore. MASSACHUSETTS: American Helicopter Airways, Boston; Wiggins Airways, Boston. MINNESOTA: Helicopter Services, Minneapolis. MISSOURI: Hemdel Helicopter Air Taxi, St. Louis. MONTANA: Johnson Flying Service, Missoula. NEVADA: Tahoe Helicopters, Reno. NEW MEXICO: New Mex Air Contractors, Deming.

NEW YORK: Execuplane, White Plains; Helicopter Services, Buffalo; New York Airways, La Guardia Airport Station; New York Trap Rock, Spring Valley. OKLAHOMA: Allied Helicopters, Tulsa. OHIO: Ohio Valley Airways, Cincinnati. OREGON: Roderick A. Fraser, Brandon; Pendleton Spraying Service, Pendleton; Skyways Schools, Troutdale. PENNSYLVANIA: Franklin Carson, Philadelphia; Delaware Valley Helicopters, Bristol; Keystone Helicopter, Philadelphia; Miller Aviation Center, Dravosburg. RHODE ISLAND: Copters



Now building and to fly early in 1959, the giant Sikorsky S-60 crane copter (above) will carry heavy loads weighing up to 6 tons by cable suspension. Sketches show both reciprocating-engine and turbine cranes handling bulky loads. Pilot can face forward or aft, using duplicate controls, to handle loads with exact precision as a flying hoist operator.
—(Sikorsky Sketches.)

Power lines (left) and rooftop factory machinery installation (right) are among construction projects expedited at great savings by Sikorsky S-58 copters. In power line operation, poles and towers were not only carried to roadless mountain sites but lowered into place with concrete footings poured by copter.
—(Sikorsky Photos.)

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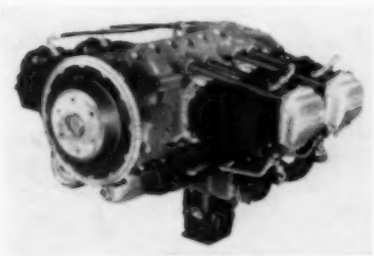
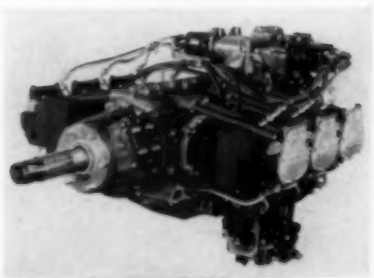


O-360-AIA



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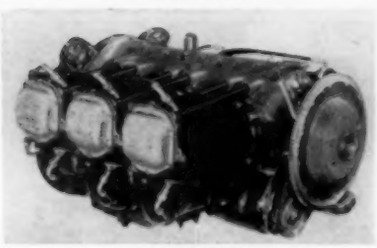
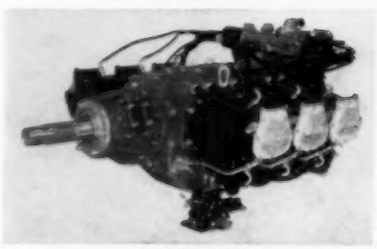


O-540-AIA



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Twin-turbine copter transport is new Sikorsky HSS-2 developed for Navy anti-submarine warfare and shown in sketch as hovering over an underwater device carried by cable. Commercial S-61 version will carry 20-25 persons. Two 1,000-hp. T-58 turbines give it 6,000-lb. load-carrying ability.
—(Sikorsky Sketch.)

Unlimited, Warwick. SO. CAROLINA: Conaire Helicopter, Spartanburg; Inland Air Lines, Myrtle Beach.

TEXAS: Continental Copters, Dallas and Fort Worth; Hawk Helicopters, Fort Worth; Helix Air Transport, Dallas; Helicopter Air Lift of Texas, Houston. WASHINGTON: Aero-Copters, Seattle; Economy Helicopters, Yakima; Allen K. Platt, Chelan. WEST VIRGINIA: Helicopter Patrol, Charleston. WYOMING: Wyoming Charter, Casper; Christler & Avery, Greybull.

CANADA: Associated Helicopters, Edmonton; AutAir, Montreal; Callison's Services, Dawson, Y. T.; Canadian Helicopters, Toronto; Canadian Vickers, Montreal; Dominion Helicopters, Toronto; Foothills Aviation, Calgary; Northern Wings Helicopters, Seven Islands; Okanagan Helicopters, Vancouver; Pacific Western AirLines, Vancouver; Spartan Air Services, Ottawa; Timmins Aviation, Montreal; Uranium Corp., Vancouver Island Helicopters, Sidney; Western Helicopter, Toronto; Eastern Provincial Airways, Gander, Newfoundland, and United Helicopters, St. Johns, Newfoundland.

Tomorrow's helicopters include ducted-fan "sky jeeps" like the experimental Piasecki VZ-8P pictured above and the Hiller XROE-1 Rotorcycle (below.) Ducted-fan vertical risers, including flying platforms, are still in development stage. Single-man Rotorcycle is in production, U. S. Marines receiving five next September from first production order. Commercial versions of both are planned.

Sikorsky Operators

Commercial customers of Sikorsky Aircraft, which produces large helicopters, include the following: Aero Service Corp., Philadelphia; California Co., New Orleans; Chance Vought Aircraft, Dallas; Chicago Helicopter Airways, Chicago; Continental Oil, Houston; Grumman Aircraft, Bethpage, N. Y.; Humble Oil, Houston; Los Angeles Airways, Los Angeles; New York Airways, La Guardia Airport, N. Y.; Okanagan Helicopters, Vancouver; Petroleum Helicopters, Lafayette and New Orleans; Sperry Gyroscope Co., Ronkonkoma, N. Y.; World Wide Helicopters, San Fernando, Cal.; Ostermans Aero, Stockholm; and Sabena Belgian Airlines, Brussels and Leopoldville.

Hiller Operators

Commercial operators of Hiller helicopters include the following: Allied Helicopter, Tulsa; Arkansas Civil Defense, Little Rock; Columbia Helicopters, Portland, Oregon; Duschak's Helicopter, Torrance, Cal.; East Coast Aviation, Lexington, Mass.; Evergreen Helicopters, Sweet Home, Oregon; Fastener Corp., Chicago; Fresno Helicopters, Fresno, Cal.; C. T. Jensen, Sacramento; Dean Johnson, McMinnville, Ore.; Livingston Airservice, Corvallis, Ore.; Mallard Airlines, Lynchburg, Va.; Meade Helicopter, Watsonville, Cal.; John Mecom, Houston; Merts Co., Cleveland; Mettner Helicopters, Arlington, Cal.; Parsons Corp., Traverse City, Mich.; J. D. Reed Co., Houston; Summit Radio, New York; Texas Gulf Sulphur, Houston; Judge A. B. Ware, Paradise, Cal.; Mississippi State Forestry Service, Jackson; Puerto Rico Water Resources Authority, San Juan; City of Los Angeles; Juneau Copter, Juneau, Alaska; Joliet Airmotive, Joliet, Ill.; Dominion Helicopters, King City, Ontario.

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President

MOONEY AIRCRAFT

(Continued from page 27)

ILLINOIS: Capitol Aviation, Springfield; National Aero Sales, Chicago.
IOWA: Airways Service, Sioux City.
KANSAS: Kansas City Mooney Sales, Ottawa; Aviation Enterprises, Kansas City.
LOUISIANA: Shreve-Aire, Inc., Shreveport.
MICHIGAN: Skylark Flying Service, Detroit.
MINNESOTA: Willmar Air Service, Willmar.
MISSOURI: Cy Willock, Inc., Kansas City.
NEVADA: Tahoe Helicopters, Reno.
NORTH CAROLINA: Southeast Airmotive, Charlotte; High Point Trinity Air Service, High Point; Smith-Regal Flying Service, Charlotte.
NORTH DAKOTA: Pietsch Flying Service, Minot.
OKLAHOMA: Neil Knight, Inc., Oklahoma City.
OREGON: Ron G. Fisher, Lebanon.
PENNSYLVANIA: Garden Spot Air Park, Inc., Lancaster; Campbell Air Service, McDonald; W. H. Grimes, Bethel.
TEXAS: Cummings Aviation, Houston; West Texas Flying Service, Midland; Lynn Aylesworth, San Antonio; Dick Ross, Hereford; Waco Aircraft Sales, Waco.
WASHINGTON: Travel Air, Inc., Spokane; Executiveair, Inc., Renton.
WISCONSIN: Watertown Aviation Co., Watertown.

Here's Bell XV-3 convertiplane in forward or airplane flight with rotors tilted fully forward.

Bell Proves Tilting Rotors Success

THE world's first successful flight conversion of tilting rotors from vertical lift for helicopter flight to 100% forward tilt for thrust in airplane flight was accomplished on December 18 by Bell Helicopter Corporation's XV-3 convertiplane near Fort Worth, Texas, and was repeated the next day. Bell Test Pilot Bill Quinlan was at the controls for both flights. The XV-3 is a fixed-wing aircraft with tilting rotors at each wing tip. They are driven by power shafted from a piston engine mounted in the fuselage. The XV-3 has no wheels, using a helicopter skid gear. It takes off and lands at zero air speed as a helicopter. Tilted 90 degrees forward, its rotors provide thrust as tractor propellers. First two conversions were made at an air speed of 115 knots and at an altitude of 4,000 ft. Convertiplane has higher forward speed capabilities than helicopter.

Rotors are tilted about 85 degrees from vertical in this stage of conversion.

CESSNA 310C

(Continued from page 22)

ft. single-engine service ceiling is for 4,830 lbs. and becomes considerably higher at lesser weights.

We gather from what we hear around the Cessna factory that the folks at the top there have become obsessed with maximum performance under single-engine conditions and it is our belief that the trend at Cessna is to continue improving multi-engine performance safety factors in the years ahead until the point is reached where pilots will experience minimum difficulties when power is lost on one engine. This is the development which is needed more than any one factor to make multi-engine flying completely acceptable to businessmen who want to fly themselves without first becoming a professional pilot or hiring one.

With the 310C's power loading, take-off acceleration is not only rapid but gives a wonderful kick in the pants so that the pilot *feels* he is going to get off the ground in a hurry. At gross weight and without wind, it's off the runway in about 800 ft., and clears 50 ft. in less than 1,400 ft. With a 15-mph. wind, these distances drop down to about 600 ft. and 1,000 ft. Minimum single-engine control speed of 82 mph. is reached almost instantly after the air speed passes 60 mph., and the nose is eased off.

Clean and with a high wing loading of 27.6 lbs. per sq. ft. (wing area is only 175 sq. ft.), the 310 is not readily slowed down but landing performance is still impressive. It takes about 1,700 ft. to land over a 50-ft. obstacle by bringing it in over the fence at 90, only 650 ft. of this being ground roll. The power is not chopped until you're ready, because a clean airplane will sink instantly with power removal under these conditions — it slows rapidly in the roll. Stall speed at gross weight and with power off but gear and flaps extended is 74 mph.

With the 310C, Cessna offers a variety of optional seating arrangements and the airplane we had featured three chairs and a couch. This couch extends rearward into the bag-

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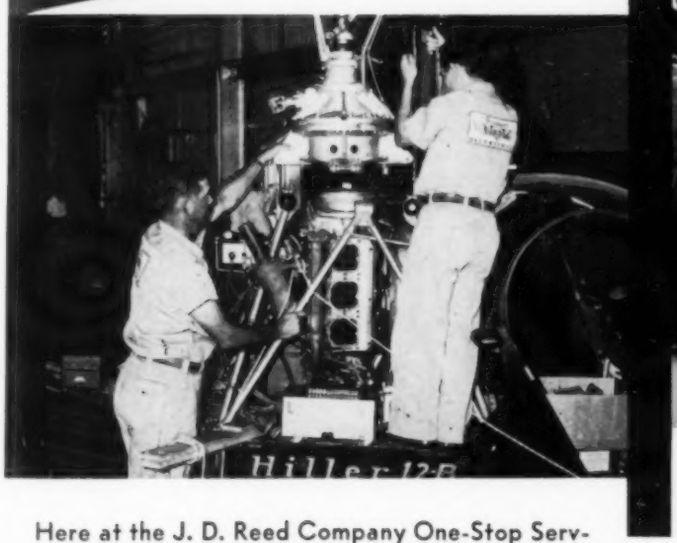

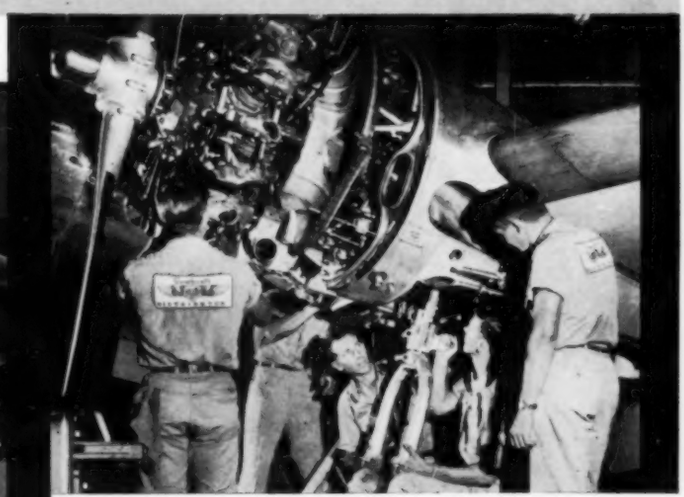

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gage compartment and its aft end has a reclining back, making it useful for sitting erect or reclining almost prone on the couch. We found this feature remarkably comfortable for an airplane of this size. We are right at 6 ft. tall and could stretch to full length for sleeping comfort. Four of us made the trip and had plenty of baggage and topcoats but none of this paraphernalia handicapped the couch. There was plenty of room for the four of us and the baggage.

Our airplane was N6677B and was invoiced at $88,765.50 with about $29,000 worth of optional gear installed at the factory. This gave it an empty weight of 3,314 lbs., as contrasted to the normal empty weight of 3,020 lbs., so that its useful load was thus reduced to 1,516 lbs. under its 4,830-lb. gross weight. But with four of us weighing less than 680 lbs., we still had about 836 lbs. available for baggage and fuel.

Optional equipment and their installed weights and costs on our demonstrator included Group 1DE radio, 241.5 lbs., $26,090 (L-2 autopilot included); 2-place lounge, no weight change, $325; headrests, 4.5 lbs., $49.50; travel desk, 3 lbs., $65; cabin divider curtain, 1 lb., $25; auxiliary fuel tanks, 30 gals., 20 lbs., $1,485; de-ice plumbing and light, 4.5 lbs., $146; propeller anti-ice system, 14 lbs., $535; co-pilot rudder pedals and control wheel, 5.5 lbs., $95; total added weight, 294 lbs.; total added costs, $28,815.50.

Our brief stay in Mexico was at Vera Cruz, a Gulf of Mexico port off the beaten path for most tourists, although some Americans stop there on cruise ships. We stayed at the Mocambo hotel, a resort for vacationers from Mexico City. On the beach, this huge place devotes more space to arched promenades, multi-level verandas, swimming pools on several floors, bandstands, terraces for dining and sunning and the like than it does to guest rooms, these numbering only 100. Its prices are extremely reasonable, the four of us staying in two adjoining doubles, with two baths, for $6.00 per day each, including three meals.

We experienced no difficulties of any kind, either in Vera Cruz with local accommodations or at the border with Mexican or U. S. customs requirements. In fact, we have never had any trouble with such things. It is our opinion that tourists can find trouble anywhere they look for it, whether on a busy U. S. airport or on the Mexican border or deep inside the big republic. We have known of such troubles, but they usually happened to first-time tourists. After a few trips, they learned the art of trying to be friendly and their difficulties disappeared. Flying tourists now crossing at Brownsville must land at the Matamoros Airport 9 miles south of Brownsville Municipal to clear Mexican customs, which were formerly located at Brownsville, where U. S. officials are officed. It was a mistake to split among the two airports because the number of planes going south has definitely dropped off — more than half. When both customs offices were together at Brownsville's airport, about 230 planes monthly or more were registered through the border. Now this number is about 90 to 100.

For us, it did not matter. Our time was limited but we had a fast airplane and purposely avoided a tight schedule. The time we spent with customs on both sides of the border was less than 1.5 hours in each direction. Only about half of it was actually required had we really rushed.

But with the 310C's performance, we forgot all about hurry. After all, we were good for better than 200 mph. ground to ground and were within 500 miles, or 2.5 hrs. of everything — Vera Cruz or Mexico City on the south and Dallas and home to the north. We had two engines with top-notch engine-out capabilities and we had solid comfort in the plush, quieted cabin of the 310C. Who could ask for anything more?

Vertol Proves Tilt Wing Success

WORLD'S first successful tilting-wing convertiplane is Vertol Aircraft Corporation's Army VZ-2, pictured above. It has made many complete conversions from helicopter vertical flight to forward airplane flight and from it many types of large and small tilt-wing transports can be developed with VTOL-STOL capabilities eliminating the need for large airports. The VZ-2 prototype is powered by a Lycoming T-53 turbine which drives a 3-bladed rotor-propeller on each wing. The wing tilts from vertical 90 degrees to horizontal. It has a span of 24 ft. 11 ins. The VZ-2's length is 26 ft. 5 ins. Vertol Chief Test Pilot Leonard LaVassar recently demonstrated its conversion at Fort Belvoir.

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Cruse Aviation, Inc.
International Airport
and Clover Field Airport
Houston, Texas

Dal-Tex Aviation, Inc.
Highland Park Airport and Love Field
Dallas, Texas

Hair Flying Service
Harding Field
Baton Rouge, Louisiana

Poelman Aircraft Co.
New Orleans Airport
New Orleans, Louisiana

Ragsdale Flying Service
Municipal Airport
Austin, Texas

Kenneth Starnes Aviation Service
Adams Field
Little Rock, Arkansas

Southwestern Skyways, Inc.
Municipal Airport
Santa Fe, New Mexico
and Ogden, Utah

Sunny South Aircraft Service, Inc.
Broward International Airport
Fort Lauderdale, Florida

Walston Aviation, Inc.
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CLINTON AVIATION

(Continued from page 25)

So, not knowing better, they went out and sold them anyway. The week of our visit, we saw two 172's sold to people who learned to fly at Clinton. Another airplane was sold to a casual individual who had strolled into the beautiful new airplane show room which accommodates six demonstrators.

"Nobody can tell about prospects for airplanes," Grant Robertson told us. "They are too unpredictable. The ones you sometimes tag as the best and hottest prospects frequently never buy. Others who appear as cold as ice will sit down and write you a good check. So everybody who comes around our lot is a potential buyer as far as we're concerned."

Clinton's quota of the new Cessna 150 two-seater amounted to 14 airplanes. All of them were sold without benefit of a demonstration — something quite unique in the airplane business.

Both Robertson and Clinton also agree on the principle that the best airplane salesman is a satisfied owner. That boils down to two simple factors — give him the finest service money can buy, and charge him a fair price and keep his airplane in the air. Their definition of a contented customer is one who uses his airplane a lot and has few if any service maintenance problems.

That's why Clinton Aviation, over the years, has built up its service facilities and gives these facilities as much attention as the sales department receives. Clinton is equipped to major overhaul all horizontally-opposed engines and specializes in all series of Continental aircraft engines. They have complete Magnaflux and Zyglo systems, they grind cylinders, overhaul propellers, prop governors, pressure carburetors, generators and voltage boxes and are completely equipped to test all work for proper operation. Their radio shop is complete in every respect.

Clinton also boasts a set of factory wing and fuselage jigs for major rebuild jobs on all Cessna models. They recently finished major rebuilds of a 310 and an L-27 for the Air Force.

Their flight school provides training leading to private, commercial, instructor and instrument ratings. For the past six years, Clinton has turned out many instrument pilots for United Air Lines' co-pilot pool.

The company has perfected a simple flat-rate system for most of the jobs it performs on Cessnas and competitive makes of aircraft. Lou Clinton told us the flat-rate system will work only if it is carefully developed and constantly managed. It can only be effective if it is fair to the customer, the mechanics and the company alike.

Eight years ago, Clinton and Robertson went into the parts and accessory distribution business, forming the now well-known Denver Airplane Supply. It keeps two salesmen on the road while five salesmen, including Clinton and Robertson, handle all aircraft sales.

Line service is especially nurtured at Clinton Aviation because it pays off. When an airplane taxis in a "follow-me" Jeep leads it to a parking space while a line service man drives up in a rental car, helps unload the baggage and takes the service order. If the travelers want the rent car, the paper is filled out en route to the office and the visitors are on their way. When they return to fly away, the Clinton people see to it that they pass through the showroom where the bright new models are beckoning for a possible trade.

Hangar space is still short at Stapleton, as it is on so many airports. But they keep working on the problem. With from 25 to 30 per cent of the new airplane customers first-timers, there's little wonder the Clinton sales force is creating the hangar shortage. From what we saw in the way of enthusiasm, sharp customer service, modern facilities and faith in the utility plane business at Clinton Aviation, we figure there will always be a hangar shortage on Denver's Stapleton Airfield.—G. E. H.

NEW HILLER H-23D-1 is a small but powerful workhorse for the Army. Prototype of the new model is pictured lifting a field piece to demonstrate its hoisting ability. It is powered by a 310-hp. Lycoming engine.

—(Hiller Photo.)

BEECH JET

(Continued from page 33)

his communications from one traffic control area to another, from airways to approach control to tower and to ground control simply by setting up the anticipated frequencies in advance and flipping the associated toggle switch when necessary to change. When the pilot selects a localizer frequency, the appropriate glideslope frequency is automatically channeled. This setup was designed for efficient single-pilot IFR operations.

AYER-LINER CONVAIR

(Continued from page 37)

38,590 ft. Landing — 3,800 ft., CAR, dry. Climb — single-engine en route climb requirement at take-off weight of 41,200 lbs., 6,050 ft. Cruise — 270 mph. TIAS, sea level to 16,500 ft.; 306 mph. TIAS never exceed speed; 181 mph. TIAS maneuvering speed. Maximum flap extension speed (TIAS) — 160 mph. for full flaps, 178 mph. for 21-30 deg., 200 mph. for 16 to 20 deg., 215 mph. for zero to 15 deg. Maximum speed for landing gear extension (TIAS) — 150 mph. during retraction and 200 mph. extended or during extension.

Electrical systems — 28-volt dc single-wire of 2 each GE 2CM75 generators. 115-volt and 26-volt 400-cycle ac system of 2 each Jack and Heintz F-45 inverters and 1 each Eclipse 12127 emergency inverter.

Air conditioning and pressurization — four engine exhaust augmentors (heat exchangers) provide heat for cabin, wing and empennage. One Stratos cabin supercharger on RH engine (70 lbs. min. airflow at sea level). Maximum cabin differential is 3.5 psi. Secondary compressor and cooling turbine (boot strap cycle) rated at 4 tons cooling. Ground blower used with secondary intercooler. Two each cabin recirculating fans. Improved cabin air distribution system with wall riser ducts, letter slot outlets plus individually adjustable cold air outlets above each seat.

Radio — 1 Collins 18S HF 20-channel communications unit (2,700-12,000 kc) coordinated with Collins 180K loading unit; 1 Collins 17M-1 or Bendix TA-18 VHF 180-channel communications transmitter, coordinated with a 180-channel Collins 51U-2 or 51X-1 VHF receiver, 118-131.95 mc; 2 Collins 51R-3 omni receivers for 280 channels, 108-135.9 mc, for localizer, omni, tower and communications; 2 Collins 51V-1 glideslope receivers, 1 Bendix MN-61A marker receiver, 2 MN-62A Bendix ADF's, 2 Collins 416N power unit for 51R-3 receivers.

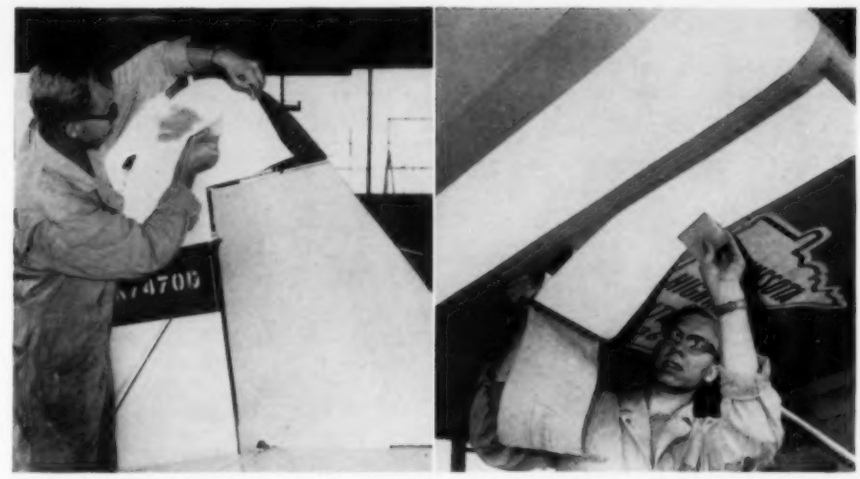
NATIONWIDE ROUNDUP:

New Business In the Hangar

DALLAS AERO SERVICE, Love Field, Dallas, has received another Phillips Petroleum Lodestar for installation of the complete Dallas Aero Service speed-safety modification kit. . . . Jim Ketner brought in his Texas Eastern Gas Transmission DC-3 for re-wiring, installation of Bendix radar, cockpit modifications and annual inspection. . . . Steel spar modification is being performed on a Catalina Airlines de Havilland Dove from Long Beach. . . . The Hughes-Kane de Havilland Dove from Santa Monica is in for installation of flat auxiliary tank, cockpit modifications and other work after having received a new Horton & Horton interior.

AIRESEARCH AVIATION SERVICE, Los Angeles International Airport, is installing an executive interior with galley in the Air Finance Corporation's DC-3. It is also being equipped with the AiResearch maximizer, four picture windows and large individual windows, a one-piece bird-resistant windshield and is getting a new exterior paint job. Pilot is Ed Schaaf. . . . Minnesota Mining and Manufacturing's Convair 340 was brought in by Pilots Don Richardson and Mel Longlett for an executive interior, radio work, installation of an auxiliary power unit, installation of a 440 sound kit and painting. . . . Three DC-6's from Canadian Pacific Airlines are being modified from cargo carriers to combination cargo-passenger configuration. Changes include two windows in the forward cargo door, movable partitions and interior refinements. Bendix radar is also being installed.

SOUTHWEST PLANE MART is the name of a new busines specializ-



FIRST FLUORESCENT PLASTIC FILM FOR AIRCRAFT MARKINGS is Minnesota Mining's "Scotchcal," applied simply by pressing in place after cleaning the surface. It is removed by peeling off as with tape. Scotchcal is readily cut by scissors or razor, can be used for any shape to integrate with existing paint scheme on aircraft. Air Force field tests of the film applied in June, 1958, indicate the film's fluorescence was still very good in December. It goes on fabric, metal or wood.

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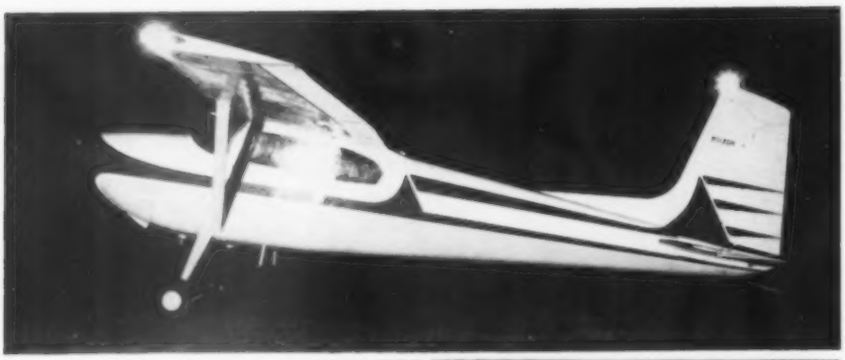

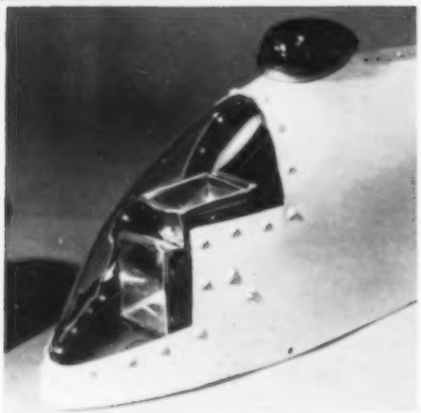

NEW TWILIGHTER COLLISION AVOIDANCE HIGH-INTENSITY LIGHTING SYSTEM for daytime protection in low visibility conditions delivers brilliant 80,000-candlepower condenser-discharge white flashes at a rate of 65-70 flashes per minute. It was perfected by Don Hoskins, 4980 Marine Drive, Chicago 40, Ill. First units for Aero Commanders, Twin-Bonanzas and Cessna 310's available in February. Transistorized Hoskins unit weighs 4.5 lbs. total, including power pack, 3 lights and cable, with 3.1-amp power demand in 12-vdc system. Unit for 24 vdc draws 5 amps, weighs 8 lbs.

ing in the sale and purchase of executive and private aircraft, established at Highland Park Airport in Dallas by Ted Cooper and associates. Pat Dunigan is president, Ted Cooper is vice president and managing executive, and H. O. Wright is sales manager. The firm will offer a complete retail and wholesale service for used aircraft throughout the Southwest, with complete financing, insurance and warranty services. Cooper has been in the airplane sales industry since 1930 and for the last five years was vice president and sales manager for Aircraft Sales Co., Ft. Worth. Wright formerly was president of Dal-Tex Aviation in Dallas, world leader in Cessna sales for 1956-57.

THE AIRCRAFT SERVICE ASSOCIATION last month elected Raymond Tonks, Aerodex, Miami, as president, and Percy A. Johnson of Grand Central Aircraft Co., Glendale, vice president. They were elected at TASA's annual meeting in Washington, D. C.

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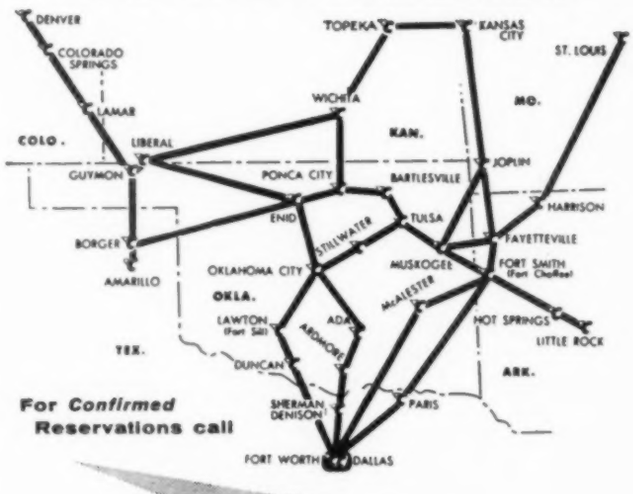

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NEW SALES AND SERVICE CENTER for Air Oasis Co., Cessna distributor at Long Beach, California, is this modernistic structure including 235 by 140-ft. hangar, 90 by 45-ft. office and glass-enclosed 80 by 40-ft. display room. Air Oasis is largest Cessna distributor. Left to right studying plans are Larry Hunt, Air Oasis president; Chamber of Commerce President John E. Biby, Jr., City Manager Sam Vickers and Noble Millie, contractor.

CAPITOL AVIATION, Capital Airport, Springfield, Illinois, had Jack Starkweather's Potaschnick Company Lockheed in for installation of Pac-Aero modification kits as follows: flap-track shortening, increased stabilizer angle of incidence, fuselage saddle fairing, short stabilizer tips, Goodyear wheels and brakes, and installation of Bendix AR-21 receiver and TA-21 transmitter. . . . A Mitchell autopilot was installed in the State Division of Highways' Cessna 310. . . . Radar work and a periodic inspection were performed on the Time-O-Matic Cessna 310. . . . Goodyear wheels and brakes were installed on Ross Bennett's Sangamo Electric Lodestar. . . . Miscellaneous work was performed on the Cox Transit Beech C-50, the S. J. Groves Co. Aero Commander, Bonanzas for Bill Knight of Chicago and Russell Steele, and Edward Long's new Cessna 175.

EXECUTIVE AIRCRAFT SERVICE, Red Bird Airport, Dallas, modified the Janitrol heater and performed minor repairs and maintenance on Ernest Valdes' LeTourneau-Westinghouse Douglas B-23 from Peoria, Ill. . . . Ken Hunter was in with his Kerr-McGhee Oil DC-3 from Oklahoma City for miscellaneous work. . . . Double engine change and other work were performed for Stein Lee's Gulf Oil Lodestar.

REMMERT-WERNER, Lambert Field, St. Louis, installed recovered control surfaces on Austin (Goody) Goodwin's Houston Lumber DC-3. . . . Jim Jackson's TVA Twin Beech was in for landing gear and brake over-

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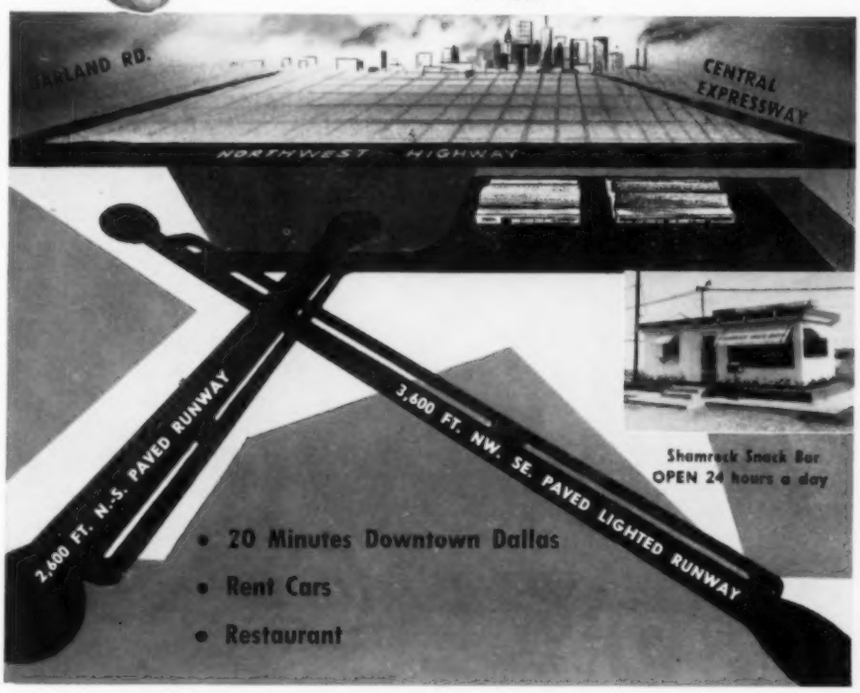

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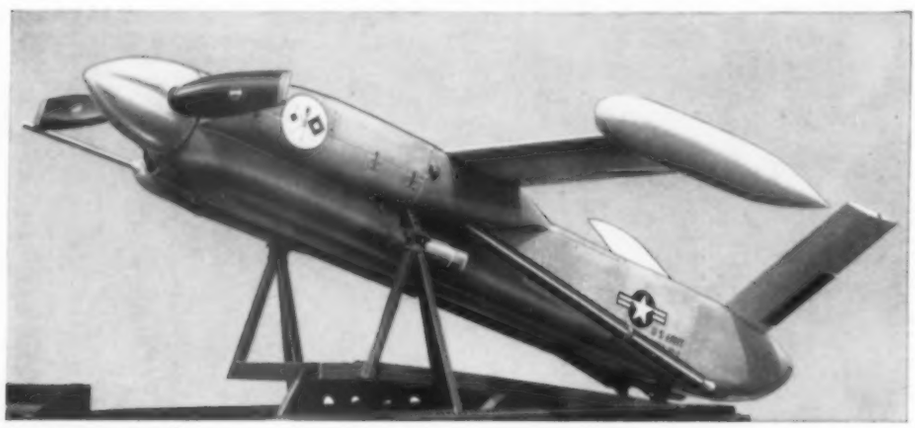
haul. . . . Fruin-Colnon Contracting's Lodestar was in for inspection, relicense, and installation of two fresh Engine Works engines, Hank Gausman and Bob Shurwan, pilots. . . . H. H. McMillan and Ed Thaggart brought in the H. C. Price DC-3 for installation of two ARC Type 21 lightweight ADF's, Collins 17L7-51X2 VHF communications, Collins 51X2 omni with two glideslope receivers and a 200,000-BTU Janitrol heater with ground blowers. . . . At Pompano Beach, Florida, a Monsanto Chemical DC-3 with Pilots Dick Thurston and Del Clark was in for annual relicense, 100-hr. inspection and engine change. . . . Skip Wittner and Bob Quelch brought in their Kewanee Oil Super-92 DC-3 for lightweight landing gear doors and 100-hr. inspection. . . . Olin Mathieson's DC-3 received freshly-covered control surfaces with geared-tab rudder.

MID-CONTINENT AIRMOTIVE CORP., 3251 Fairfax Ave., Fairfax Airport, Kansas City, has been incorporated as an independently operated subsidiary of Pacific Airmotive Corp. John M. Myers, PAC president, said it encompasses former PAC branches at Denver, Kansas City and Chicago and will distribute major aircraft lines in Illinois, Missouri, Wisconsin, Iowa, northern Indiana, southern Michigan, Minnesota, Nebraska, Kansas, Oklahoma, Arkansas, Mississippi, Texas, North Dakota, South Dakota, southeastern Wyoming, New Mexico and Colorado. President is Horace A. Smith, former Kansas City branch manager. Other officers are Roy Backman, vice president, and R. C. Emrey, secretary-treasurer. James M. Staker is Denver branch manager and Boyd H. Gillen heads the Chicago branch.

FIELD AVIATION CO., McCall Field, Calgary, Alberta, Canada, will open in February a new concept in hangar construction for corporate and commercial aircraft sales, service and storage. Adjacent to the Calgary air terminal, it was constructed of prestressed concrete, has 53,000-sq. ft. of space, 30-ft. high electrically-operated hangar doors, infra-red radiant heating which uses gas, modern lounge for pilots and passengers and complete aircraft sales and services.



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Another Way to Skin a Cat

SEVEN tired hunters stepped from their jeep at Lebanon, New Hampshire, municipal airport, and hurried toward Indiana Gear Works' executive DC-3. The temperature was 5 above zero. A hard, cold wind blew in from the north at 15 knots. The hunters expected to enter the plane's warm cabin to relax during the 5-hour flight back to Indianapolis. But it didn't turn out that way. IGW's chief pilot, Max Jobst, stood on a step ladder next to the starboard engine, peering intently in-

OXYGEN MASKS FOR PASSENGERS aboard Boeing 707 jet airliners are being furnished by Aro Equipment Co. and are automatically extended if cabin pressure fails. Stewardesses are pictured demonstrating them.

side, muttering under his breath. That engine's starter wasn't working. It was Sunday, and no mechanic and no replacement parts were available.

How to get home? Jobst and Indiana Gear's President John Buehler got busy. A long length of ¾-inch manila line was taken from the four-wheel drive jeep. The line was wrapped tightly around the propeller spinner, with one end tied to the jeep's rear bumper. A towel was used to prevent the bumper's sharp edge from severing the rope. The hunters piled into the jeep, to provide traction, and at a given signal from the pilot in the cockpit, the jeep took off across the icy taxi strip. The blades of the propeller, hand set to a close compression point, turned once . . . twice . . . almost caught on. Then, the rope broke.

The procedure was repeated, but this time the line was doubled, and sand was spread over the ice. The jeep took off again. The plane's engine coughed . . . roared . . . but died. The jeep had struck a strip of uncovered ice, and had veered to the right, bringing the line across a prop blade. It broke again.

Patiently, Buehler and Purdue University's Dr. Bill Combs spliced the line, and once again it was wrapped double around the spinner. The jeep moved off slowly, until the line was taut. The hunters climbed on again, two on the hood this time, to give better traction forward. Pilot Jobst re-entered the plane's cockpit. Near the flight shack, a group of veteran New England pilots had gathered. They shook their heads grimly at this unorthodox way of starting an engine.

The signal was given. Power was poured into the jeep's two transmissions, and the little vehicle sped across the ramp in a straight line. The propeller blades turned slowly, almost painfully at first. The engine gave a gasp . . . then another . . . followed by a powerful roar, as she burst into action . . . the prop turning at full rpm. . . . heavy white smoke streaming from the exhaust.

A loud cheer went up from the hunters, and they finally piled aboard, headed for home.

As the DC-3 passed over the intersection a few minutes later, gaining altitude, the Yankee pilots still stood with mouths ajar . . . pondering all they'd seen and heard.

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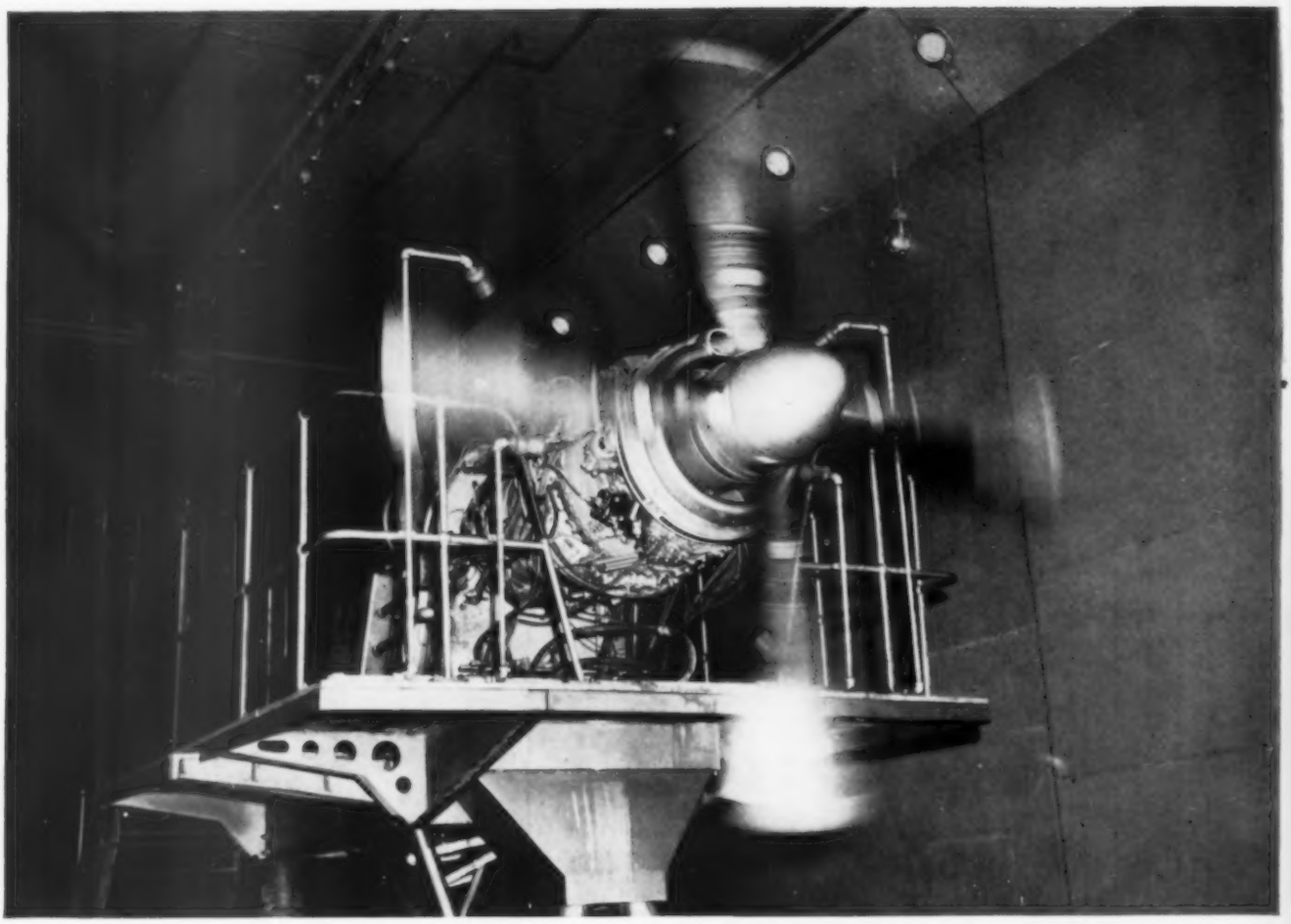
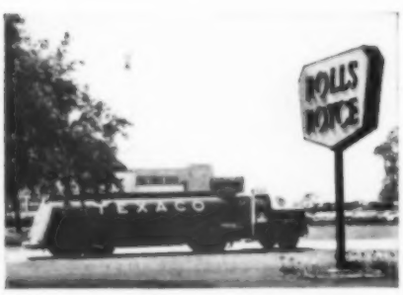


The Rolls-Royce Dart prop-jet, shown on test at Montreal, has the longest overhaul life of any aircraft gas turbine. For nearly four years, 1400 and 1600 s.h.p. versions powering the Vickers Viscount were the only gas turbine engines on regular airline service. Texaco Aircraft Turbine Fuel supplied by McColl-Frontenac Oil Co., Ltd., Montreal.

ROLLS-ROYCE evaluations of Dart aero engines are made with Texaco fuel



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